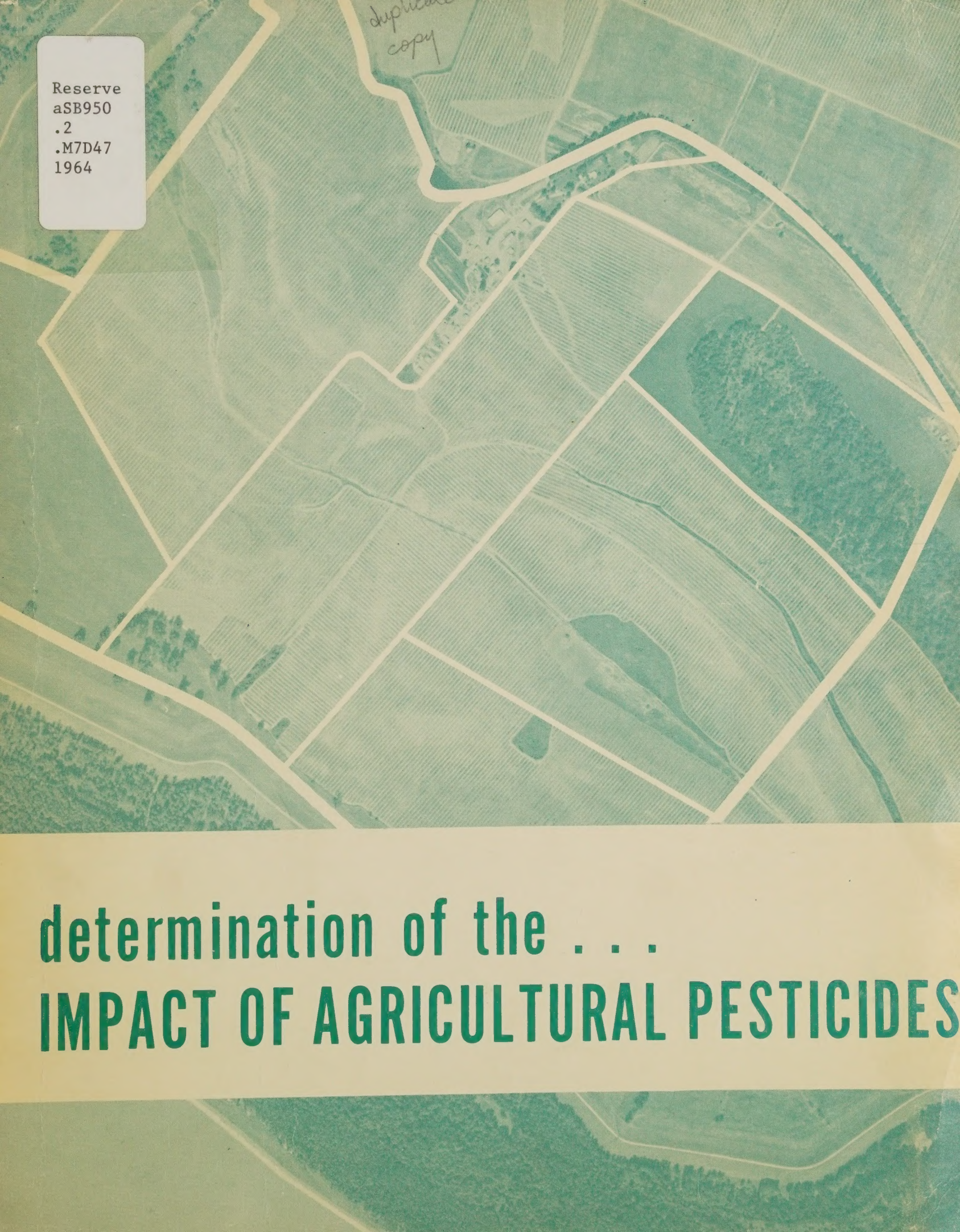


Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.

Reserve
aSB950
.2
.M7D47
1964

duplicate
copy

An aerial photograph of a rural landscape, showing a grid of agricultural fields. A prominent yellow line, likely a road or boundary, runs diagonally across the frame. The fields are mostly green, with some areas showing signs of being recently plowed or planted. A small cluster of trees is visible in the lower-left corner.

determination of the . . . IMPACT OF AGRICULTURAL PESTICIDES

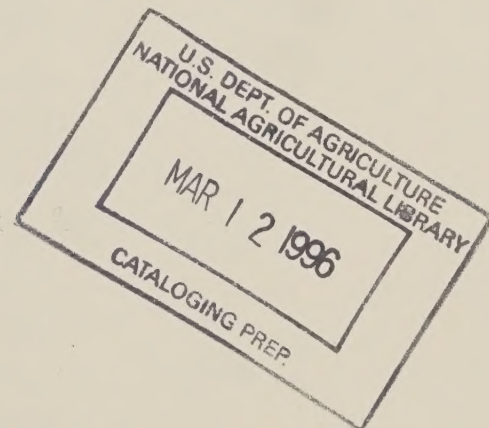
**United States
Department of
Agriculture**



National Agricultural Library

Determination of Impact of Agricultural
Pesticides on the Environment

A Preliminary Report of Data Recorded
from Greenville, Mississippi, location
through December 15, 1964



Plant Pest Control Division
Agricultural Research Service
U. S. Department of Agriculture
Hyattsville, Md. 20781

December, 1964

TABLE OF CONTENTS

	Tab No.
Introduction	1
Some Considerations for Aligning and Strengthening the Delta Monitoring Program	2
Program Plan	3
Guidelines for Field Operations	4
Methods of Chemical Analysis	5
GRA (Area A; Greenville, Mississippi) Chemical Treatment History, Soil Samples for Pesticides, Sweep Net, Pitfall Traps, and Soil Samples for Biologicals Arranged by Block	6-A
GRA - Water and Silt Samples, Apiary Samples, Crop and Miscellaneous Samples, Light Trap Collections, Nuisance Pests, and Weather Data	6-B
GRB (Area B; Greenville, Mississippi) Chemical Treatment History, Soil Samples for Pesticides, Sweep Net, Pitfall Traps, and Soil Samples for Biologicals Arranged by Block	7-A
GRB - Water and Silt Samples, Apiary Samples, Crop and Miscellaneous Samples, Light Trap Collections, Nuisance Pests, and Weather Data	7-B
Blood Cholinesterase Determinations, and Relation of Pesticides to Honey Bee Colonies on Plots GRA and GRB	8

INTRODUCTION

To carry out its responsibility in monitoring the impact of the normal use of agricultural pesticides, the U.S. Department of Agriculture established a pilot study in the Mississippi River Delta in May 1964. The objective of the first year's operation was to determine existing pesticide residue levels in soil, water, crops, livestock, and certain species of aquatic and terrestrial animal life. Special attention was also given to pesticide impact on nontarget insects including bees and other beneficial species. The program in the Delta is to continue over a minimum period of three years in an effort to determine the rates of accumulation and depletion of residues in the various components of the environment.

The pilot program was established through close coordination of Departmental organizations interested in pesticide use. The Agricultural Research Service Divisions most active in the design and establishment of the program included Plant Pest Control, Entomology Research, Pesticides Regulation, Animal Disease Eradication, and Meat Inspection. Biometrical Services also assisted in planning the study. The Plant Pest Control Division was assigned the primary responsibility for conduct of the program.

To implement the program five locations, involving cotton, rice, and soybean production were selected in the Mississippi River drainage area: two in Arkansas and three in Mississippi. Each location contains two one-square mile areas. The areas are subdivided into blocks for sampling purposes. Samples are collected on a scheduled basis from different

components of the environment and chemical analysis run wherever pesticides residues are involved. Collections are supported by current pesticide use records, including materials used, amounts and methods of application. In addition, through cooperation of owners and operators, a pesticide use history is compiled for each area by year for the past several seasons. The program plan and guidelines for field activities give details of the operations.

Although the Delta program has been in operation only a few months, some gross observations can be made from results obtained thus far. Some of the more significant are:

1. Analyses of soil and water indicate that pesticide residues are not present at high levels in these agricultural areas having high pesticide use histories.
2. Despite the large quantities of pesticides applied in the study areas during the past season, there appeared to be little buildup of residues in soil during this interval.
3. Many samples of pollen have been found to contain pesticide residues; however, honey has been found to be free of the residues in all samples studied. Although there is no way to compare the bees placed in the area with colonies not exposed to pesticides, all colonies survived and surplus honey was produced. Prospects of the colonies going through the winter are fair.

4. Light trap catches ran over 1 gallon per night during the season of greatest insect activity. This would indicate that heavy pesticide use in the area is not creating a "biological desert" from the standpoint of nontarget arthropods.

Data accumulated thus far this year on the program in one location (Greenville) are summarized in attachments. Reports will be prepared on the remaining four locations as soon as possible. It should be pointed out that this is a preliminary report; results are not yet available in all phases of the work. Detailed analysis of the data from this location, as well as from other locations, will be made prior to next season's operations, including statistical examination of results wherever indicated. This should provide a basis for strengthening the work and for realigning it, if necessary, with the Department's current and future needs in monitoring the effects of pesticide use. It will also permit a more accurate evaluation of the results of the study.

Appreciation is extended to the Entomology Research Division for assistance given on arsenic analyses at the Kerrville, Texas, laboratory; for phosphate analyses performed by the Tifton, Georgia, laboratory; for confirmatory analyses performed at the Beltsville, Maryland, laboratories; and for most of the field work on bees, which was carried out by Bee Breeding Investigations, Baton Rouge, Louisiana.

Thanks are extended also to personnel of the Animal Disease Eradication Division for drawing blood samples from livestock for cholinesterase level

determinations and for "tagging" animals for later identification at slaughter. All blood cholinesterase level determinations, both in cattle and program personnel, were performed at the Brucellosis Testing Laboratory, ADE, Baton Rouge, Louisiana.

SOME CONSIDERATIONS FOR ALIGNING AND
STRENGTHENING THE DELTA MONITORING PROGRAM

1. Inasmuch as four areas (Wilson, Greenville, Scott, and Utica) involve cotton and soybeans as principal crops, consideration should be given to shifting either the Greenville or Scott location to another area of the South. These two locations are closely similar in crop practices and situated in a radius of about 20 miles. Priority areas which need monitoring include southern Alabama and the lower Rio Grande Valley of Texas. The Alabama area has a known history of dieldrin use in relation to potato and vegetable production. The Lower Valley has a high pesticide use history in relation to vegetable, citrus and cotton production. Drift is reported to be a major problem in the latter areas. While it is not possible, because of lack of funds, to establish operations in these new locations, shifting of one of the locations mentioned above would give the Department certain residue information, particularly on food crops, which will not be derived from the Delta study.
2. Some of the arthropod studies as conducted in 1964 appear to have little significance under conditions of the Delta study. Results from light traps, for example, show little difference between Areas A and B in any one location. An attempt was made to select indicators insofar as possible from insects which may have developed in the immediate one-square mile area. Due to the lack of true check areas and to the mobility of insects in general, the light traps results would seem to indicate little of significance other than that there is an abundance of nontarget insects in this region having a history of heavy pesticide use. The bee study is promising and the work will be expanded next year.

All phases of the insect studies should be carefully evaluated following statistical analysis and corrections and deletions made as warranted. It would seem that those species which live in intimate contact with residues in the environment, such as soil and water forms, would be more appropriate in this study. It is believed that the sampling is too limited in the pit-fall and soil insect study. These surveys will be both broadened and intensified. It should be pointed out that the biological work requires at least one-half of all the time devoted to field work.

3. Methodology in field sampling should be critically examined. It is apparent from examination of analytical results that the soil sampling method may need adjustment in order to obtain more representative samples. Tests are being conducted on efficiency of different sampling methods. Biometrical Services is assisting in this and in the examination of other sampling.
4. It is believed that the interval between soil samplings should be expanded from one month to three months. This would give a preseason, midseason and end of season sampling. By lengthening the interval, more samples could be taken at each interval. It is not recommended that fewer samples should be taken. In fact, more soil samples should be collected than in 1964.
5. The laboratory work should be strengthened through addition of necessary equipment and qualified personnel and improvement in procedures and methodology. Many improvements have been made as the work progressed.
6. Chemical analyses of arsenic were run on soil alone this year. It is planned, in the future, to study the arsenic content of diverse types of samples to determine if the old residues of arsenic occur in the various

media. In the 1964 soil study arsenic was found in almost all samples analyzed. It would seem that soil which has not had arsenic added may hold "natural" arsenic of around 4 or 5 p.p.m. In order to arrive at a figure which may be of value statistically, repeated analyses were run on the same block with the hope that an average value may be obtained. If one takes this level as normal or blank value, then it may be postulated that the higher levels are residues left from application of arsenic pesticides to crops predating the use of chlorinated hydrocarbons plus possible additions from current use of arsenical herbicides. Likewise, an area requiring considerably more attention is that concerned with residues of phosphate insecticides. Equipment is being acquired to provide analysis of samples for phosphate residues as is presently being done with chlorinated hydrocarbons. The present colorimetric analyses are too cumbersome and expensive to permit the detail of study that is desired.

7. Studies on pesticide drift should be intensified.

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
Washington, D. C. 20250

PROGRAM PLAN
Determination of Impact of Agricultural
Pesticides on Lower Mississippi River
Area

Need for Program

Information derived from this program will be useful in formulating policy and conduct of operations in the pesticides use field, both within the Department and on the interdepartmental level. Federal agencies and their State counterparts may utilize the data in pesticide research, pesticide regulations, control recommendations and operations, and recommendations for other agronomic practices. These actions will benefit growers, operators, and food and feed industry as more will be known of the present risk of contamination of agricultural products. The chemical industry and applicators will find results from such studies useful in developing more sound practices in formulation and application. The consumer will be better protected through more complete knowledge of the agricultural pesticide residue situations in areas affecting his water and food sources.

The monitoring studies in the lower Mississippi River area will serve also as a pilot project for a nationwide agricultural monitoring program.

Purpose

The purpose of this program is to develop basic objective information for the Secretary of the U. S. Department of Agriculture and his cooperators for their use in agricultural pesticide consideration.

Information derived from this project will be useful in formulating
and control of operations in the production of food, both within the
Department and at the interdepartmental level. Technical resources and
State counterparts will utilize the data in pesticide research, pesticide
regulation, control recommendations and operations, and
other economic pesticides. There are many other areas of research,
and food and feed industry as well as the health of the people and
production of agricultural products. The Department of Agriculture
will find results from such studies useful in formulating
in formulation and application. The Department will be better protected through
more complete knowledge of the agricultural situation in
areas affecting the water and food resources.
The monitoring studies in the Department will also serve as
a pilot project for a nationwide agricultural

Objectives

- A. To determine levels of pesticides in the following areas of the agricultural environment:
 - 1. Soils
 - 2. Water (in agricultural areas)
 - 3. Agricultural and other food and feed products.
- B. To monitor the same areas periodically to establish trends of depletion or accumulation of residues.
- C. To study the impact of agricultural pesticides on nontarget organisms in the environment including beneficial, phytophagous and nuisance insects, and plants. Special attention will be given to indicator organisms to measure possible biological magnification of residues.
- D. To record results of studies and develop reports for appropriate distribution.

1. The following are the principal areas of the region-

2. The following are the principal areas of the region-

3. The following are the principal areas of the region-

4. The following are the principal areas of the region-

5. The following are the principal areas of the region-

6. The following are the principal areas of the region-

7. The following are the principal areas of the region-

8. The following are the principal areas of the region-

9. The following are the principal areas of the region-

10. The following are the principal areas of the region-

11. The following are the principal areas of the region-

12. The following are the principal areas of the region-

Period of Operation

The program in the lower Mississippi River area should be initiated as soon as possible, not later than May 18, 1964. After initiation, it should be placed on a continuing basis as a part of the developing program for monitoring agriculture pesticides on a national basis.

Manpower and Equipment Requirements To Initiate Program

A. Manpower

1. Supervisory

2 specialists

1 chemist

1 field supervisor (entomologist)

2. Laboratory

4 chemists

4 technicians

3. Field (surveys and sample collections)

5 entomologists (supervisory)

10 assistants

Field personnel will be organized in crews of three. One crew will be assigned to each area for the duration of this season's work.

B. Equipment

1. Analytical - the best available, including gas chromatography, colorimetric, ultra violet, infra red, etc.

2. Survey and sampling

- a. Five complete sets of entomological collecting equipment, including 10 light traps and other survey tools.
- b. Five complete sets of equipment necessary for collecting and transporting soil, water, and biological samples.
- c. Transportation - to be arranged.

4

5

6-A

6-B

7-A

<u>Indicator Locations</u>	<u>Major Crops or Commodities</u>	<u>Principal Pesticides</u>
1. Greenville, Mississippi (Location No. 1)	Cotton	Methyl parathion
	Soybeans	Endrin
	Livestock	BHC
		Toxaphene
		DDT
		Herbicides
		Defoliants
2. Greenville, Mississippi (Location No. 2)	Same as Loc. #1	Same as Loc. #1
3. Stuttgart, Arkansas	Rice	Aldrin (seed treatment)
	Soybeans	Herbicides
4. Mississippi County, Ark.	Cotton	Chlorinated hydrocarbons
	Soybeans	
5. Copiah County, Miss.	Cotton	Methyl parathion
	Vegetables	
	Livestock	Toxaphene

Detailed description of Figure 1: The graph plots 'Number of eggs per female' on the vertical axis (ranging from 0 to 100) against 'Number of females per nest' on the horizontal axis (ranging from 0 to 10). There are 10 data points plotted. A solid line represents a fitted curve that starts at approximately (1, 10) and rises steeply, passing through points like (2, 20), (3, 35), (4, 50), (5, 65), (6, 80), (7, 90), (8, 100), (9, 110), and (10, 120). The curve appears to follow a power-law function, $y = ax^b$, where a and b are constants.

Journal of Interpersonal Violence 26(10)

100

13

2000

そのうちいつかおれは

family

Implications: (1) The model is a
(3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40) (41) (42) (43) (44) (45) (46) (47) (48) (49) (50) (51) (52) (53) (54) (55) (56) (57) (58) (59) (60) (61) (62) (63) (64) (65) (66) (67) (68) (69) (70) (71) (72) (73) (74) (75) (76) (77) (78) (79) (80) (81) (82) (83) (84) (85) (86) (87) (88) (89) (90) (91) (92) (93) (94) (95) (96) (97) (98) (99) (100) (101) (102) (103) (104) (105) (106) (107) (108) (109) (110) (111) (112) (113) (114) (115) (116) (117) (118) (119) (120) (121) (122) (123) (124) (125) (126) (127) (128) (129) (130) (131) (132) (133) (134) (135) (136) (137) (138) (139) (140) (141) (142) (143) (144) (145) (146) (147) (148) (149) (150) (151) (152) (153) (154) (155) (156) (157) (158) (159) (160) (161) (162) (163) (164) (165) (166) (167) (168) (169) (170) (171) (172) (173) (174) (175) (176) (177) (178) (179) (180) (181) (182) (183) (184) (185) (186) (187) (188) (189) (190) (191) (192) (193) (194) (195) (196) (197) (198) (199) (200) (201) (202) (203) (204) (205) (206) (207) (208) (209) (210) (211) (212) (213) (214) (215) (216) (217) (218) (219) (220) (221) (222) (223) (224) (225) (226) (227) (228) (229) (230) (231) (232) (233) (234) (235) (236) (237) (238) (239) (240) (241) (242) (243) (244) (245) (246) (247) (248) (249) (250) (251) (252) (253) (254) (255) (256) (257) (258) (259) (260) (261) (262) (263) (264) (265) (266) (267) (268) (269) (270) (271) (272) (273) (274) (275) (276) (277) (278) (279) (280) (281) (282) (283) (284) (285) (286) (287) (288) (289) (290) (291) (292) (293) (294) (295) (296) (297) (298) (299) (300) (301) (302) (303) (304) (305) (306) (307) (308) (309) (310) (311) (312) (313) (314) (315) (316) (317) (318) (319) (320) (321) (322) (323) (324) (325) (326) (327) (328) (329) (330) (331) (332) (333) (334) (335) (336) (337) (338) (339) (340) (341) (342) (343) (344) (345) (346) (347) (348) (349) (350) (351) (352) (353) (354) (355) (356) (357) (358) (359) (360) (361) (362) (363) (364) (365) (366) (367) (368) (369) (370) (371) (372) (373) (374) (375) (376) (377) (378) (379) (380) (381) (382) (383) (384) (385) (386) (387) (388) (389) (390) (391) (392) (393) (394) (395) (396) (397) (398) (399) (400) (401) (402) (403) (404) (405) (406) (407) (408) (409) (410) (411) (412) (413) (414) (415) (416) (417) (418) (419) (420) (421) (422) (423) (424) (425) (426) (427) (428) (429) (430) (431) (432) (433) (434) (435) (436) (437) (438) (439) (440) (441) (442) (443) (444) (445) (446) (447) (448) (449) (450) (451) (452) (453) (454) (455) (456) (457) (458) (459) (460) (461) (462) (463) (464) (465) (466) (467) (468) (469) (470) (471) (472) (473) (474) (475) (476) (477) (478) (479) (480) (481) (482) (483) (484) (485) (486) (487) (488) (489) (490) (491) (492) (493) (494) (495) (496) (497) (498) (499) (500) (501) (502) (503) (504) (505) (506) (507) (508) (509) (510) (511) (512) (513) (514) (515) (516) (517) (518) (519) (520) (521) (522) (523) (524) (525) (526) (527) (528) (529) (530) (531) (532) (533) (534) (535) (536) (537) (538) (539) (540) (541) (542) (543) (544) (545) (546) (547) (548) (549) (550) (551) (552) (553) (554) (555) (556) (557) (558) (559) (560) (561) (562) (563) (564) (565) (566) (567) (568) (569) (570) (571) (572) (573) (574) (575) (576) (577) (578) (579) (580) (581) (582) (583) (584) (585) (586) (587) (588) (589) (590) (591) (592) (593) (594) (595) (596) (597) (598) (599) (600) (601) (602) (603) (604) (605) (606) (607) (608) (609) (610) (611) (612) (613) (614) (615) (616) (617) (618) (619) (620) (621) (622) (623) (624) (625) (626) (627) (628) (629) (630) (631) (632) (633) (634) (635) (636) (637) (638) (639) (640) (641) (642) (643) (644) (645) (646) (647) (648) (649) (650) (651) (652) (653) (654) (655) (656) (657) (658) (659) (660) (661) (662) (663) (664) (665) (666) (667) (668) (669) (670) (671) (672) (673) (674) (675) (676) (677) (678) (679) (680) (681) (682) (683) (684) (685) (686) (687) (688) (689) (690) (691) (692) (693) (694) (695) (696) (697) (698) (699) (700) (701) (702) (703) (704) (705) (706) (707) (708) (709) (710) (711) (712) (713) (714) (715) (716) (717) (718) (719) (720) (721) (722) (723) (724) (725) (726) (727) (728) (729) (730) (731) (732) (733) (734) (735) (736) (737) (738) (739) (740) (741) (742) (743) (744) (745) (746) (747) (748) (749) (750) (751) (752) (753) (754) (755) (756) (757) (758) (759) (760) (761) (762) (763) (764) (765) (766) (767) (768) (769) (770) (771) (772) (773) (774) (775) (776) (777) (778) (779) (780) (781) (782) (783) (784) (785) (786) (787) (788) (789) (790) (791) (792) (793) (794) (795) (796) (797) (798) (799) (800) (801) (802) (803) (804) (805) (806) (807) (808) (809) (810) (811) (812) (813) (814) (815) (816) (817) (818) (819) (820) (821) (822) (823) (824) (825) (826) (827) (828) (829) (830) (831) (832) (833) (834) (835) (836) (837) (838) (839) (

[illegible]

•

the 1990s, the number of people in the world who are illiterate has increased from 1.2 billion to 1.5 billion. The number of illiterate people in the world is projected to reach 1.7 billion by the year 2015. The number of illiterate people in the world is projected to reach 1.7 billion by the year 2015.

1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 26

2000

1970-1971, 1971-1972, 1972-1973, 1973-1974, 1974-1975, 1975-1976, 1976-1977, 1977-1978, 1978-1979, 1979-1980, 1980-1981, 1981-1982, 1982-1983, 1983-1984, 1984-1985, 1985-1986, 1986-1987, 1987-1988, 1988-1989, 1989-1990, 1990-1991, 1991-1992, 1992-1993, 1993-1994, 1994-1995, 1995-1996, 1996-1997, 1997-1998, 1998-1999, 1999-2000, 2000-2001, 2001-2002, 2002-2003, 2003-2004, 2004-2005, 2005-2006, 2006-2007, 2007-2008, 2008-2009, 2009-2010, 2010-2011, 2011-2012, 2012-2013, 2013-2014, 2014-2015, 2015-2016, 2016-2017, 2017-2018, 2018-2019, 2019-2020, 2020-2021, 2021-2022, 2022-2023, 2023-2024, 2024-2025, 2025-2026, 2026-2027, 2027-2028, 2028-2029, 2029-2030, 2030-2031, 2031-2032, 2032-2033, 2033-2034, 2034-2035, 2035-2036, 2036-2037, 2037-2038, 2038-2039, 2039-2040, 2040-2041, 2041-2042, 2042-2043, 2043-2044, 2044-2045, 2045-2046, 2046-2047, 2047-2048, 2048-2049, 2049-2050, 2050-2051, 2051-2052, 2052-2053, 2053-2054, 2054-2055, 2055-2056, 2056-2057, 2057-2058, 2058-2059, 2059-2060, 2060-2061, 2061-2062, 2062-2063, 2063-2064, 2064-2065, 2065-2066, 2066-2067, 2067-2068, 2068-2069, 2069-2070, 2070-2071, 2071-2072, 2072-2073, 2073-2074, 2074-2075, 2075-2076, 2076-2077, 2077-2078, 2078-2079, 2079-2080, 2080-2081, 2081-2082, 2082-2083, 2083-2084, 2084-2085, 2085-2086, 2086-2087, 2087-2088, 2088-2089, 2089-2090, 2090-2091, 2091-2092, 2092-2093, 2093-2094, 2094-2095, 2095-2096, 2096-2097, 2097-2098, 2098-2099, 2099-2100, 2100-2101, 2101-2102, 2102-2103, 2103-2104, 2104-2105, 2105-2106, 2106-2107, 2107-2108, 2108-2109, 2109-2110, 2110-2111, 2111-2112, 2112-2113, 2113-2114, 2114-2115, 2115-2116, 2116-2117, 2117-2118, 2118-2119, 2119-2120, 2120-2121, 2121-2122, 2122-2123, 2123-2124, 2124-2125, 2125-2126, 2126-2127, 2127-2128, 2128-2129, 2129-2130, 2130-2131, 2131-2132, 2132-2133, 2133-2134, 2134-2135, 2135-2136, 2136-2137, 2137-2138, 2138-2139, 2139-2140, 2140-2141, 2141-2142, 2142-2143, 2143-2144, 2144-2145, 2145-2146, 2146-2147, 2147-2148, 2148-2149, 2149-2150, 2150-2151, 2151-2152, 2152-2153, 2153-2154, 2154-2155, 2155-2156, 2156-2157, 2157-2158, 2158-2159, 2159-2160, 2160-2161, 2161-2162, 2162-2163, 2163-2164, 2164-2165, 2165-2166, 2166-2167, 2167-2168, 2168-2169, 2169-2170, 2170-2171, 2171-2172, 2172-2173, 2173-2174, 2174-2175, 2175-2176, 2176-2177, 2177-2178, 2178-2179, 2179-2180, 2180-2181, 2181-2182, 2182-2183, 2183-2184, 2184-2185, 2185-2186, 2186-2187, 2187-2188, 2188-2189, 2189-2190, 2190-2191, 2191-2192, 2192-2193, 2193-2194, 2194-2195, 2195-2196, 2196-2197, 2197-2198, 2198-2199, 2199-2200, 2200-2201, 2201-2202, 2202-2203, 2203-2204, 2204-2205, 2205-2206, 2206-2207, 2207-2208, 2208-2209, 2209-2210, 2210-2211, 2211-2212, 2212-2213, 2213-2214, 2214-2215, 2215-2216, 2216-2217, 2217-2218, 2218-2219, 2219-2220, 2220-2221, 2221-2222, 2222-2223, 2223-2224, 2224-2225, 2225-2226, 2226-2227, 2227-2228, 2228-2229, 2229-2230, 2230-2231, 2231-2232, 2232-2233, 2233-2234, 2234-2235, 2235-2236, 2236-2237, 2237-2238, 2238-2239, 2239-2240, 2240-2241, 2241-2242, 2242-2243, 2243-2244, 2244-2245, 2245-2246, 2246-2247, 2247-2248, 2248-2249, 2249-2250, 2250-2251, 2251-2252, 2252-2253, 2253-2254, 2254-2255, 2255-2256, 2256-2257, 2257-2258, 2258-2259, 2259-2260, 2260-2261, 2261-2262, 2262-2263, 2263-2264, 2264-2265, 2265-2266, 2266-2267, 2267-2268, 2268-2269, 2269-2270, 2270-2271, 2271-2272, 2272-2273, 2273-2274, 2274-2275, 2275-2276, 2276-2277, 2277-2278, 2278-2279, 2279-2280, 2280-2281, 2281-2282, 2282-2283, 2283-2284, 2284-2285, 2285-2286, 2286-2287, 2287-2288, 2288-2289, 2289-2290, 2290-2291, 2291-2292, 2292-2293, 2293-2294, 2294-2295, 2295-2296, 2296-2297, 2297-2298, 2298-2299, 2299-2300, 2300-2301, 2301-2302, 2302-2303, 2303-2304, 2304-2305, 2305-2306, 2306-2307, 2307-2308, 2308-2309, 2309-2310, 2310-2311, 2311-2312, 2312-2313, 2313-2314, 2314-2315, 2315-2316, 2316-2317, 2317-2318, 2318-2319, 2319-2320, 2320-2321, 2321-2322, 2322-2323, 2323-2324, 2324-2325, 2325-2326, 2326-2327, 2327-2328, 2328-2329, 2329-2330, 2330-2331, 2331-2332, 2332-2333, 2333-2334, 2334-2335, 2335-2336, 2336-2337, 2337-2338, 2338-2339, 2339-2340, 2340-2341, 2341-2342, 23

1997-1998

1055

RECEIVED DIRECTOR

100

1915

Procedures

- I. Compile a pesticide use history on indicator areas selected above.
 - A. Through direct contact with farmers, Federal and State agencies concerned with pesticide use, industry, and others.
 - B. Through supplemental information from all other available sources including complete literature review.
- II. Determine base levels of pesticide residues in soils, water, and agricultural products through study in indicator locations. Studies will be made in one-square mile (approximate) work areas, selected in predetermined locations. Selection of the locations will be based on their specialized pesticide use history (See Indicator Locations above). The one-square mile study areas will be typical of the agricultural practices carried on in the particular location. Two one-square mile areas will be selected in each location. Each area will be defined by a permanent boundary such as property line, drainage ditch, road, etc. The primary area will be one that has practiced intensive pest control, preferably over a long period of time. The replicate area will be in vicinity of the primary area. Wherever possible the second area will be one where less extensive use has been made of pesticides. The objective is to establish areas of greatest contrast in pesticide use practices.

The two areas in any one location will have essentially the same agricultural makeup; i.e., if cotton is the principal crop, the areas should contain this crop on a major scale. Each area will have a minimum of one stream or other composite drainage area such as a pond, slough, or drainage ditch.

1. Supply a suitable set of maps as follows:
A. Through direct contact with the Bureau, Federal and State agencies.

B. Through appropriate individuals from all other available sources including complete literature review.

Determine past levels of pesticide residues in soils, water, etc.
agitation - promote through study in laboratory, etc.
be - source will (agitation) with new, selected, etc.
location. Selection of the location will be based on their specialized
results has history (see literature location). The survey will
study area will be typical of the agricultural area to be
the particular location. The area will be selected in each
location. The area will be defined by boundaries such as
crops, etc., etc. The survey area will be one
that has produced intensive crop control practices over a long period of
time. The location area will be in vicinity of the primary area. However
possible. The survey area will be one where a pesticide has been used
or not used. The objective is to establish areas of greatest concern in
pesticide use practices.

The study areas will be divided and mapped according to present land use. Each land use area will be marked by a permanent or recognizable boundary such as turnrow, road, ditch, stream, property line, etc. Each land use area will be considered as a block, indicated as such by a code on an official map. For evaluation purposes, particularly from standpoint of statistical analysis, it is important that all sampling be done on a block basis; e.g., samples from cotton will not be collected and analyzed together with those from pastures in another block.

Detailed procedures for program operations are outlined in a separate work plan.

A. Soils:

- (1) Collect and analyze composite samples from each land use block. Take two composite samples (25 cores) per block. Soil sampling will be done at monthly intervals.

B. Water:

- (1) Sample and analyze runoff water from composite drainage sources (ponds and streams), two bottom, two top, two surface samples per body of water. Take a set of samples from 1 pond and 1 stream per area, 6 in each type of location.
- (2) Take four silt samples (25 cores per sample) per area.
- (3) Well and cistern water. Two samples per area (5 gallons per sample). Water and silt samples will be taken at monthly intervals or as indicated by farm practices.

C. Agricultural and other food and feed products:

... 369 ...

[illegible]

- (1) Take samples of foliage and other plant parts and run analyses for pesticide residues. Take at least 2 samples per crop or pasture per month or as indicated.
- (2) It may be desirable to check domestic animals and animal products for residue accumulations. This phase should be undertaken if residues in soil, water, and crops indicate need.

III. After establishing base levels of residues in indicator areas, repeat sampling at predetermined intervals and run analyses as outlined under (II) above. For instance, repeat at three monthly intervals during growing season (July, August, September) then one sampling four months later (January), additional sampling after another three months (April).

IV. Determine impact of agricultural pesticides use on nontarget organisms in the environment through use of indicator species or groups.

- (1) Beneficial insects.
- (2) Nontarget phytophagous insects.
- (3) Nuisance pests of man and animals.
- (4) Nontarget plant life where defoliant and herbicides are used.

This will serve as indicator of drift problem. (Other drift data will be taken from pasture samplings in regard to insecticides).

- (5) Selected organisms as possible indicators of potentiation of residues.

A. Prior to treatment, if possible, establish base population levels through appropriate survey methods in primary and check areas using indicator species or groups listed above.

Make observations on conditions of nontarget plant life.

the first of these is the fact that the
the second is the fact that the

the third is the fact that the

the fourth is the fact that the

the fifth is the fact that the

the sixth is the fact that the

the seventh is the fact that the

the eighth is the fact that the

the ninth is the fact that the

the tenth is the fact that the

the eleventh is the fact that the

the twelfth is the fact that the

the thirteenth is the fact that the

the fourteenth is the fact that the

B. During seasonal treatment period determine impact of programs on indicator species using same methods selected under A.

In most cases surveys will be conducted at weekly intervals.

C. Record and evaluate data.

V. Progress reports will be submitted to PPC Division Director by the Regional Supervisor on a biweekly basis. Reports on results of the studies will be prepared and submitted periodically, or whenever significant findings are discovered, during the monitoring operations. At the end of this series of tests, a detailed report will be prepared on the overall program.

VI. The first year's study should develop a basic profile of the existing pesticide residue situation in this region. Subsequent annual studies patterned along the same lines as the preliminary work, will show trends of pesticide residues and certain side effects of pesticide use in the region.

PPC-ARS-USDA
May 25, 1964
(Revised)

1970 10 10
 1970 10 15
 (1970 10 15)

DETERMINATION OF IMPACT OF PESTICIDES ON
LOWER MISSISSIPPI RIVER AREA

Guidelines for Field Operations

Background

See Program Plan

Objectives

- A. To determine levels of pesticides in the following areas of the agricultural environment:
 1. Soils
 2. Water (in agricultural areas)
 3. Agricultural and other food and feed products.
- B. To monitor the same areas periodically to establish trends of depletion or accumulation of residues.
- C. To study the impact of agricultural pesticides on nontarget organisms in the environment including beneficial, phytophagous and nuisance insects, and plants. Special attention will be given to indicator organisms to measure possible biological magnification of residues.
- D. To record results of studies and develop reports for appropriate distribution.

Procedures

Training. Each entomologist in charge of an area will be given training, prior to reporting to his area, in methods for collecting soil and water samples, operation of light traps, mice traps, making aquatic collections, counting flies on cattle and operation of the fly grid.

Areas and Blocks

An area is approximately one square mile (640 acres) of agricultural farmland that has been selected for study. Each unit has two such areas under observation, and will be coded for records as A and B.

A Block is a portion of the 640 acres, and is designated as such from actual farm use. It may be 40 or 100 acres, more or less, in pasture or cotton, or it may be fallow or woodland. The farm use of land will determine the size and number of blocks in an area. Each block will be given an assigned code number which will be the key to its identification.

1. Pesticide use records

A. Contact owners or operators of each block in each indicator area and compile history.

1. Complete EI T/Form No. 1 through interview with owner or operator. Submit two copies of form to Regional Office.

a. Use one form per block per year.

b. Start with 1964; compile year-to-date history only. Operations after this date will require additional recording.

c. Then work backward through 1963, 1962, etc., as far as authentic records can be determined, to 1954 if possible. Use one form per block per year. Historical records may be difficult to obtain because of change of boundaries, lack of records, etc. When this situation is encountered, enter "no records available" under "Remarks" on the form and add comments if necessary.

B. Supplement information gained from farm operators with other pertinent information that can be obtained from commercial pesticide applicators, county agents, research personnel, and other reliable sources. If supplemental information will not conform to format of form, enter it under "Remarks" or on the back of form.

C. Record current pesticide use information. Use EI T/Form No. 1 and record data called for after each pesticide application. Complete one form for each block for each application.

the first of these is the fact that the
the second is the fact that the
the third is the fact that the
the fourth is the fact that the
the fifth is the fact that the
the sixth is the fact that the
the seventh is the fact that the
the eighth is the fact that the
the ninth is the fact that the
the tenth is the fact that the
the eleventh is the fact that the
the twelfth is the fact that the
the thirteenth is the fact that the
the fourteenth is the fact that the
the fifteenth is the fact that the
the sixteenth is the fact that the
the seventeenth is the fact that the
the eighteenth is the fact that the
the nineteenth is the fact that the
the twentieth is the fact that the
the twenty-first is the fact that the
the twenty-second is the fact that the
the twenty-third is the fact that the
the twenty-fourth is the fact that the
the twenty-fifth is the fact that the
the twenty-sixth is the fact that the
the twenty-seventh is the fact that the
the twenty-eighth is the fact that the
the twenty-ninth is the fact that the
the thirtieth is the fact that the
the thirty-first is the fact that the
the thirty-second is the fact that the
the thirty-third is the fact that the
the thirty-fourth is the fact that the
the thirty-fifth is the fact that the
the thirty-sixth is the fact that the
the thirty-seventh is the fact that the
the thirty-eighth is the fact that the
the thirty-ninth is the fact that the
the fortieth is the fact that the
the forty-first is the fact that the
the forty-second is the fact that the
the forty-third is the fact that the
the forty-fourth is the fact that the
the forty-fifth is the fact that the
the forty-sixth is the fact that the
the forty-seventh is the fact that the
the forty-eighth is the fact that the
the forty-ninth is the fact that the
the fiftieth is the fact that the
the fifty-first is the fact that the
the fifty-second is the fact that the
the fifty-third is the fact that the
the fifty-fourth is the fact that the
the fifty-fifth is the fact that the
the fifty-sixth is the fact that the
the fifty-seventh is the fact that the
the fifty-eighth is the fact that the
the fifty-ninth is the fact that the
the sixtieth is the fact that the
the sixty-first is the fact that the
the sixty-second is the fact that the
the sixty-third is the fact that the
the sixty-fourth is the fact that the
the sixty-fifth is the fact that the
the sixty-sixth is the fact that the
the sixty-seventh is the fact that the
the sixty-eighth is the fact that the
the sixty-ninth is the fact that the
the seventieth is the fact that the
the seventy-first is the fact that the
the seventy-second is the fact that the
the seventy-third is the fact that the
the seventy-fourth is the fact that the
the seventy-fifth is the fact that the
the seventy-sixth is the fact that the
the seventy-seventh is the fact that the
the seventy-eighth is the fact that the
the seventy-ninth is the fact that the
the eightieth is the fact that the
the eighty-first is the fact that the
the eighty-second is the fact that the
the eighty-third is the fact that the
the eighty-fourth is the fact that the
the eighty-fifth is the fact that the
the eighty-sixth is the fact that the
the eighty-seventh is the fact that the
the eighty-eighth is the fact that the
the eighty-ninth is the fact that the
the ninetieth is the fact that the
the ninety-first is the fact that the
the ninety-second is the fact that the
the ninety-third is the fact that the
the ninety-fourth is the fact that the
the ninety-fifth is the fact that the
the ninety-sixth is the fact that the
the ninety-seventh is the fact that the
the ninety-eighth is the fact that the
the ninety-ninth is the fact that the
the hundredth is the fact that the

II. Determine base levels of pesticides in selected study areas. First sampling should be complete by June 15. An additional set of samples will be collected by July 15 and each month thereafter throughout the season. See Program Plan for further information on duration of program.

A. Soils (Sample once per month)

1. Two samples will be taken per block at each sampling. One sample will be taken along a line diagonally across the block, the other sample along the other diagonal of the block at an angle to the path taken by applicators during treatment with pesticides. All soil sampling will be done with a 2-inch diameter soil corer provided for this purpose. Twenty-five (25) cores will represent one sample. The separate cores should be spaced equidistant along the diagonals without actual measurement.
2. The twenty-five cores will be taken to a depth of 3 inches each and placed in a bucket provided for this purpose. When all twenty-five are taken, care being taken not to get samples from different blocks mixed up, they will be screened thru a 1/4" screen also provided. Stones, roots, twigs, grass, etc., will be discarded from screen. After all soil has passed through screen once, it is again passed through in order to mix the soil as thoroughly as possible. A gallon container is then filled with the mixed, screened soil and sealed with an air-tight lid. The container is labeled with sample number and date. Be sure proper label is on each. Attach after filling. An envelope containing data sheet describing the sample is fastened to outside of container with scotch tape. Be sure that both empty and filled soil containers are not exposed to pesticide contamination.
3. Ship sample to laboratory.

1. *Pharmaceutical industry* – The pharmaceutical industry is the largest of the three industries, with sales of \$10.5 billion in 1997. It is the only industry that has not experienced a decline in sales since 1990. The industry is dominated by a few large firms, with the top five firms accounting for 40% of sales. The industry is also characterized by high R&D expenditures, with the top five firms accounting for 60% of total R&D.

B. Water: Pond, stream, lake, ditch. (Sample water once a month or as deemed necessary).

1. Sub-surface water

- a. A hand pump will be used to draw sub-surface water directly into the sample bottle, a 5-gallon carboy. This should be a 2-man operation; one man holding the suction hose of the hand pump and gradually moving it back and forth with the inlet a few inches below the surface, the other person operating the pump and directing the outlet into the sample bottle.
- b. One sample will be taken in each sampling period. The area to be sampled should be split in halves and water taken from the midpoint of each half. If a boat is required, it should be used; otherwise, the sample should be taken from the bank. There are a number of advantages in taking the sample from the boat, the most important of which is that the boat may be in motion as the sampling proceeds and thus a more representative sample obtained.

2. Bottom water

- a. To obtain the bottom sample, the pump suction hose should be fastened to a pole which will comfortably reach the bottom. The inlet of the hose should be fastened one foot from the bottom. Then, as the second man operates the pump, the first man slowly moves the pole along the bottom. A certain amount of silt will be stirred up in this operation and will find its way into the sample jug. This need not be a concern of the sampler.
- b. If a boat is used to take the bottom sample, the pole may be dragged behind the boat as the boat coasts along. The extra

...the ... of the ...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

length of the pole below the intake will help maintain the distance above the bottom.

Note: If the water source is 3 feet or less deep, combine the sub-surface and bottom water sample, making only one sample.

3. Surface water

- a. A funnel-shaped float or other apparatus provided for this purpose will be used to take surface water. If the float is used it will be attached directly to hose so that all water entering hose comes from the surface of the pond or stream. The sample may be taken from the bank by attaching a long pole or bamboo rod to funnel so that it may be moved back and forth along the surface. A broad flat scoop may be used to take surface water from representative area. Take one 5-gallon sample per period in area suitable for this method.

4. Well and cistern water

- a. Take one 5-gallon carboy sample from wells in area, 1 gallon per well. If more than 5 wells in area, limit sample to that number.
- b. Take one 5-gallon carboy sample from cisterns (if available) in area, limit collection to 5 cisterns (1 gallon per cistern).

Note: Water bottles come to the field sterilized and sealed. When they are filled, wrap the cork in aluminum foil and plunge it tightly in the mouth, then fold foil down over lip. Next, place another piece of foil over top of seal and fasten securely. Extreme care will be exercised at all times to protect water samples from contamination.

5. Silt and sediment (sample once per month).

a. The silt and sediment will be the most difficult to obtain with any uniformity. The best procedure is to use a soil corer with a long handle. The soil corer will be driven into the bottom far enough to just reach solid earth. It may then be withdrawn and the core emptied into the sample container. The water brought up with the mud may be decanted as it separates out. A sample will consist of 25 two-inch diameter cores of silt. If the silt is deep, it should be sampled in its entire depth so 25 cores will vary considerably in deep silt. For this reason, it may be necessary to take a large container, say a 5-gallon pail, as a collecting vessel. After all the cores have been taken and the water decanted, a stick or dowel may be used to completely mix the silt in the sampling container; then, a 1-gallon representative part is transferred to the gallon sample pail for submission to the laboratory.

6. Labeling

The sample containers should be identified with labels provided. The label should be tied or taped to the carboys and fastened to the cans with scotch tape. The gallon sample pails, prior to use, should have a manila envelope fastened to the side with scotch tape. Into this envelope will be placed a duplicate label. DO NOT get the wrong label on a container.

7. Data sheets

Data sheets will be executed in their entirety and will accompany each sample. It is extremely important that this be done inasmuch as data sheets will be used throughout the analytical procedure to accompany the sample so that the analyst may make pertinent remarks and record final analyses data on these sheets. These will then become a permanent part of the analytical file.

8. Remarks

On the data sheets, there is space for "Remarks." The sampling team should make use of this to advise the analytical staff and data processors of any unusual instances or happenstances in connection with the sampling. Examples that are important are: unusual contamination, such as spillage in the stream, accidental treatment of the water area, unusually heavy rains, extremely low water, extremely high water, high water draining adjacent land not normally a part of the drainage system.

9. Ship sample to laboratory.

C. Agricultural and other food and feed products

All crops should be sampled immediately before or at time of harvest. Harvest will be considered any usage of crop in which it might find its way into food for animal or man.

It must be understood that the principal weak point in determination of residues on crops is that of obtaining a representative sample. This problem is magnified in the monitoring effort now under way in that instead of the usual small experimental plots, the sampling must now be done on a block as much as a hundred acres in size. Only the extreme care and vigilance of the persons taking the samples can overcome this almost insurmountable problem.

The following directions are guidelines rather than rigid barriers to individual consideration. If departure is made from these guidelines, it should be so indicated on the back of the sample sheet with the reason for such departure. The staff which must interpret the results must have all pertinent data to make this study meaningful. Any data bearing on the problem of sampling must accompany the samples so affected. Do

not trust to memory and, above all, do not send a separate memorandum after the samples are taken. The separate memorandum may never reach the person who must have the information. If approval of a procedure is desired before sampling, it should be done by phone or memorandum, and this fact should be so indicated on the data sheets. If a change seems desirable in the guidelines that follow, this will be done by issuance of new pages. Upon receipt of changes, the old directions should be discarded.

Follow instructions of supervisors for handling and shipment of perishable products. Always be sure to freeze perishable specimens immediately after collection and keep them frozen until they reach the laboratory.

5

6-A

6-B

7-A

1. The first part of the report deals with the general situation of the country. It is a very interesting and informative study of the country's development. The author has done a great deal of research and has gathered a wealth of material. The report is well written and is a valuable contribution to the study of the country's development.

2. The second part of the report deals with the economic situation of the country. It is a very interesting and informative study of the country's economic development. The author has done a great deal of research and has gathered a wealth of material. The report is well written and is a valuable contribution to the study of the country's economic development.

3. The third part of the report deals with the social situation of the country. It is a very interesting and informative study of the country's social development. The author has done a great deal of research and has gathered a wealth of material. The report is well written and is a valuable contribution to the study of the country's social development.

4. The fourth part of the report deals with the political situation of the country. It is a very interesting and informative study of the country's political development. The author has done a great deal of research and has gathered a wealth of material. The report is well written and is a valuable contribution to the study of the country's political development.

5. The fifth part of the report deals with the cultural situation of the country. It is a very interesting and informative study of the country's cultural development. The author has done a great deal of research and has gathered a wealth of material. The report is well written and is a valuable contribution to the study of the country's cultural development.

Guidelines for sampling of individual crops:

1. Hay, forage, pasture.

A sample will consist of 10 pounds of the crop. The first should be taken along a diagonal over the field from about 5 equidistant spots over its entire length. The second should be taken along the other diagonal.

The crop should be cut with a forage cutter, provided for this purpose, with extreme care so that the cut forage does not get in contact with the soil. The soil may be contaminated with an insecticide not present on the forage.

The forage cutter will cut more grass than is needed if a swath is cut completely across the field; therefore, with a little care and thought, the length of diagonal can be calculated and only as many sampling spots cut as needed for the 10 pounds of grass. This is done by cutting grass for a certain number of paces, skipping the next increment of paces; then cutting for the same number as the first cut. Then, skip the same number of paces skipped first and so on but continue across the entire two diagonals of the field.

The accumulated cuts are then placed in a plastic bag inside a canvas bag, weighed, labeled, and sent to the laboratory. The data sheet should be placed in an envelope between the plastic bag and the canvas bag. The identifying label should be tied to the mouth of the bag. The weight at time of sampling is important. This may be the gross weight of bag and sample; if so, a notation should be made on the data sheet as to empty bag weight, also.

The labels on the two diagonals of any one field are identical. This is understood. The laboratory will work these up as duplicate samples.

Department of the Interior, Bureau of Land Management

Washington, D.C. 20250

Dear Sir:

I am writing to you regarding the matter of the

land grant to the State of California.

Very truly yours,

John D. Smith, Secretary of the Interior

Enclosed for you are two copies of the

report of the Commission on the

Land Grant.

I am sure that you will find the

information contained therein of interest.

I am, Sir, very respectfully,

Your obedient servant,

John D. Smith

Enclosed for you are also two copies of the

report of the Commission on the

Land Grant.

I am, Sir, very respectfully,

Your obedient servant,

John D. Smith

Enclosed for you are also two copies of the

report of the Commission on the

Land Grant.

I am, Sir, very respectfully,

Your obedient servant,

John D. Smith

Enclosed for you are also two copies of the

report of the Commission on the

2. Cotton:

The mature cotton plant at time of harvest should be sampled. Also, seed from the picked cotton should be obtained.

a. Plants:

Ten pounds of plant material is desired. This is equal to about 10 mature plants. To get this, an estimate should be made of the number of rows in the field. This should be so divided that 10 evenly spaced rows are selected, starting several rows from the end of the field. The sampler should walk into the field, 5 paces on the first sampling row and cut off cotton plant 6 inches from the ground with a corn knife or machete. On the next sampling row, the sampler should walk in one-tenth the distance across the field; on the third sampling row, two-tenths the distance. On the fourth, three tenths, and so on. When 10 cotton plants are obtained, they should be cut into pieces small enough to fit in the plastic bag as used for forage. For the other sample from the field, repeat this procedure but be sure to start at opposite corner of field. The bag should then be weighed, labeled, and provided with data sheet.

b. Seed:

If necessary, the sampler should accompany the cotton to the gin. Ten pounds of seed should be obtained with care, making sure the seed comes from the field under study. Remember that much seed may remain in the gin from the previous ginning so time should be allowed for this to be run out before the sample is taken.

If the sample is taken from seed being returned to the farm, care should be taken to obtain the 10 pounds from many parts of the load so that it will be truly representative.

The first of these is the fact that the

the second is the fact that the

the third is the fact that the

the fourth is the fact that the

the fifth is the fact that the

the sixth is the fact that the

the seventh is the fact that the

the eighth is the fact that the

the ninth is the fact that the

the tenth is the fact that the

the eleventh is the fact that the

the twelfth is the fact that the

the thirteenth is the fact that the

the fourteenth is the fact that the

the fifteenth is the fact that the

the sixteenth is the fact that the

the seventeenth is the fact that the

the eighteenth is the fact that the

the nineteenth is the fact that the

the twentieth is the fact that the

the twenty-first is the fact that the

the twenty-second is the fact that the

the twenty-third is the fact that the

the twenty-fourth is the fact that the

the twenty-fifth is the fact that the

the twenty-sixth is the fact that the

the twenty-seventh is the fact that the

It is then placed in plastic bag, weighed, labeled, and provided with data sheets.

3. Corn:

The corn should be sampled in the same manner as the cotton, using 10 corn plants as one sample. Two samples should be taken. The time of harvest will vary, depending on usage of the corn. Sweet corn will be sampled at the time the corn normally is shipped to market. Silage corn samples will be taken at the time the corn is being processed for silage. Field corn samples will be taken as the corn is being picked.

The ears of corn should accompany each plant in the same bag. They should not be husked. This will be done at the laboratory, if required.

4. Soybeans:

Soybeans used for forage will be sampled as forage. Soybeans grown for seed will be sampled both as whole plants and as seed. For seed, 10 pounds may be obtained from the harvester as it moves over the field, with care that seed from about 20 portions of the field are included in the sample.

Twenty mature plants will be considered a sample. These plants should be taken in the same manner as corn.

5. Rice:

Rice should be sampled at maturity, both as complete plants and as grain. About 10 pounds of mature plants should be taken as a sample on diagonals across the field as in forage, but with the added precaution against tramping and shattering the crop.

It would be better not to obtain the sample than to antagonize the farmer.

THE UNIVERSITY OF CHICAGO

CHICAGO, ILL.

1911

TO THE EDITOR OF THE JOURNAL OF THE
ROYAL ANTHROPOLOGICAL INSTITUTE
LONDON
I have the honor to acknowledge the receipt of your letter of the 10th inst. in relation to the above-named subject. I am sorry to hear that you have been unable to obtain the desired information. I have, however, been unable to obtain the same myself. I have, however, been unable to obtain the same myself. I have, however, been unable to obtain the same myself.

Very respectfully,
J. H. H. H.

I have the honor to acknowledge the receipt of your letter of the 10th inst. in relation to the above-named subject. I am sorry to hear that you have been unable to obtain the desired information. I have, however, been unable to obtain the same myself. I have, however, been unable to obtain the same myself. I have, however, been unable to obtain the same myself.

I have the honor to acknowledge the receipt of your letter of the 10th inst. in relation to the above-named subject. I am sorry to hear that you have been unable to obtain the desired information. I have, however, been unable to obtain the same myself. I have, however, been unable to obtain the same myself. I have, however, been unable to obtain the same myself.

The grains of rice may be taken from the combine at various parts of the field to insure it being representative, as in soybeans.

6. Sugarcane:

Sugarcane should be sampled as corn, at time of maturity. Two samples should be taken from the field.

7. Truck crops:

Only the marketable portions of truck crops should be sampled unless the residue is used for cattle feed.

At least 10 pounds of sample should be provided along diagonals across the field with two samples per field. No less than 10 individual vegetables, or the like, will be a sample regardless of weight. In other words, 10 cabbage, or 10 watermelons.

The data sheet should show how many bags represent a sample in such cases. It is conceivable for watermelons that 10 bags will be used. The labels should be marked a, b, c, etc., and a¹, b¹, c¹, etc., for the two samples from the separate diagonals, if more than one bag per sample is required.

8. Nut crops (Pecans):

Ten pounds of mature nuts will represent a sample of the grove, with two samples to be provided from each grove.

Take these as nearly as possible along diagonals across the field.

These nuts should be sent to the laboratory in the shell, not hulled.

9. Sweetpotatoes:

Should be sampled as vegetable or truck crop.

10. Samples of milk, farm stored meat, game, fish, or other food products for human consumption will be collected only when results of other monitoring activities indicate need for such. This entire phase

...the ... of ...

...the ... of ...

...the ... of ...

...the ... of ...

...the ... of ...

...the ... of ...

...the ... of ...

...the ... of ...

...the ... of ...

...the ... of ...

...the ... of ...

...the ... of ...

...the ... of ...

requires special handling. Special sampling instructions will be issued if need arises.

III. Determine impact of agricultural pesticides use on nontarget organisms including (1) beneficial insects, (2) nontarget phytophagous insects, (3) nuisance pests of man and animals, (4) nontarget plant life, and (5) selected organisms which may show biological magnification of residues. Record information on EI T/Form No. 2 where applicable. Submit two copies of form to Regional Office.

A. Light traps: Operate 1 black light trap per area for one night per week. Place trap near center of area. Collect, count, and record Lepidoptera listed below. Preserve remainder of catch in alcohol, label container, and ship to Gulfport taxonomic unit. Place partially completed forms (EI T/F #2) in envelope and tape securely to container. Taxonomic unit will complete form after sorting remainder of collection.

1. Click beetles (Elateridae)
2. Calosoma spp. (predatory ground beetles)
3. Blister beetles (Meloidae)
4. Scarab beetles (Scarabaeidae)
5. Spotted cucumber beetle (Diabrotica undecimpunctata howardi)
6. Tiger beetles (Cincidellidae)
7. Giant water bug (Lethocerus americanus)
8. Southern green stink bug (Nezara viridula)
9. Treehoppers (Membracidae)
10. Tomato and tobacco hornworms (Protoparce spp.)
11. Salt-marsh caterpillar (Estigmene acrea)

B. Sweep net: Take 100 sweeps per block, where habitat is suitable, per week; one sweep covers 180 degrees. Starting at edge of field walk

1

The following information was obtained from a review of the files of the [redacted] and [redacted] and is being furnished to you for your information. The information is being furnished to you in confidence and is not to be distributed outside your agency.

The information is being furnished to you in confidence and is not to be distributed outside your agency. The information is being furnished to you in confidence and is not to be distributed outside your agency.

The information is being furnished to you in confidence and is not to be distributed outside your agency. The information is being furnished to you in confidence and is not to be distributed outside your agency. The information is being furnished to you in confidence and is not to be distributed outside your agency.

The information is being furnished to you in confidence and is not to be distributed outside your agency.

The information is being furnished to you in confidence and is not to be distributed outside your agency.

The information is being furnished to you in confidence and is not to be distributed outside your agency.

The information is being furnished to you in confidence and is not to be distributed outside your agency.

The information is being furnished to you in confidence and is not to be distributed outside your agency.

The information is being furnished to you in confidence and is not to be distributed outside your agency.

The information is being furnished to you in confidence and is not to be distributed outside your agency.

The information is being furnished to you in confidence and is not to be distributed outside your agency.

The information is being furnished to you in confidence and is not to be distributed outside your agency.

The information is being furnished to you in confidence and is not to be distributed outside your agency.

The information is being furnished to you in confidence and is not to be distributed outside your agency.

The information is being furnished to you in confidence and is not to be distributed outside your agency.

The information is being furnished to you in confidence and is not to be distributed outside your agency.

The information is being furnished to you in confidence and is not to be distributed outside your agency.

straight into field. Make counts and record totals of following insects collected.

1. Grasshoppers (Acrididae). Adults and nymphs.
2. Lady beetles (Coccinellidae Beneficial) Adults
3. Bumble bees (Apidae)

C. Soil samples: Take 10 cores per block, once per month, in same blocks selected for pitfall work. Divide cores into 2 samples. Cores will be taken to depth of approximately 1 foot with 5-inch soil auger, or other implement. Sift or shake soil and retrieve invertebrates listed below.

1. White grubs (Scarabaeidae)
2. Wireworms (Elateridae)
3. Earthworms (annelids)

Make and record counts. Freeze specimens and label for submission to laboratory for residue analysis.

D. Pitfall traps: Place 6 wide-mouth ice cream containers in soil to ground level in each selected block. Record location and fill one-third full with 70 percent alcohol. Place traps in afternoon, collect first thing next morning.

Combine collections, make two samples of 3 containers each. Make counts of organisms listed below and record. Make this survey biweekly.

1. Ants (Formicidae)
2. Spiders (Araneida)
3. Ground beetles (Carabidae)
4. Earwigs (Dermaptera)
5. Field crickets (Acheta sp.)
6. Rove beetles (Staphalinidae)

1. The first step in the process of the investigation is the selection of the area to be studied. This is done by the investigator, who chooses the area which he considers most likely to yield the most valuable results.

2. The second step is the collection of data. This is done by the investigator, who goes to the selected area and collects the data which he needs for his study. This may be done in a number of ways, depending on the nature of the study.

3. The third step is the analysis of the data. This is done by the investigator, who examines the data which he has collected and tries to find out what it tells him about the problem which he is studying.

4. The fourth step is the presentation of the results. This is done by the investigator, who writes up his findings and presents them to the public in a report or a book.

5. The fifth step is the evaluation of the results. This is done by the investigator, who tries to find out how well his study has done and what he has learned from it.

E. Nuisance species

1. Mosquitoes: Using dip net make and record counts weekly of larvae for one pond and one stream or ditch (if available) per area. Take 2 samples each consisting of 5 dips at 5 previously selected points.
2. Ticks: Make drag counts in suitable habitat (pasture, fallow, woodland, ditchbank). Each such sample will consist of 10 drags, 100 feet per drag. Take two samples per area weekly and record findings. Count adults and nymphs.
3. House Flies: Make grid counts once per week. Place grid in suitable location near habitation or barn in sunshine. Wait for 1 or 2 minutes until flies are settled. Take count. Place the grid a second time. Take count and average the two counts, and record average on form. Take 2 samples per area.
4. Tabanids: (Horse flies only) Make counts on 10 animals, if available, per area per week. If 10 animals are not present on area, divide available animals into two equal samples. Be sure to use same number in both areas A and B. Using binoculars, walk around animals and count number of horse flies resting on or annoying each animal. Record average per animal.
5. Chiggers: Place black construction paper (8 x 10½) flat on ground in suitable habitat and leave for at least 10 minutes. Make and record counts. Take 2 samples per week per area, 5 exposures per sample.
6. Fleas and mice: This is a three-way project.
 - a. Place 10 mouse traps (continuous type) at random in suitable locations. Make 2 samples, 5 traps per sample. Make and record population counts for 2 continuous nights per month, check each morning. Continue until 10 mice are caught.

The first of these is the fact that the
 system is not a simple one, but a complex one.
 It is a system of many parts, each of which
 has its own function, and all of which must
 work together in order to perform the overall
 function of the system. This is why it is so
 difficult to understand the system as a whole,
 and why it is so easy to get lost in the
 details of the individual parts. The second
 point is that the system is not static, but
 dynamic. It is constantly changing, and
 the changes are often rapid. This is why it
 is so difficult to keep up with the system,
 and why it is so easy to become out of
 touch with the current state of the system.
 The third point is that the system is not
 linear, but non-linear. This means that the
 relationship between the input and the output
 is not a straight line, but a curve. This
 makes it very difficult to predict the output
 of the system, and it is often the case that
 small changes in the input can lead to large
 changes in the output. The fourth point is
 that the system is not deterministic, but
 probabilistic. This means that the output of
 the system is not a fixed value, but a range
 of possible values. This makes it very difficult
 to predict the output of the system, and it is
 often the case that the output of the system
 is different from what was expected. The fifth
 point is that the system is not isolated, but
 interconnected. This means that the system
 is not a closed system, but an open system.
 It is constantly interacting with the outside
 world, and the outside world is constantly
 interacting with the system. This makes it
 very difficult to understand the system as a
 whole, and it is often the case that the
 system is more than the sum of its parts.

- b. Chloroform a total of 10 mice, 5 per sample, and make flea counts. Comb carcasses, make and record counts (average per animal).
 - c. Preserve the 10 mice for residue analysis according to instructions. Make two samples.
- F. Bees: Two colonies of bees are located in each area. One colony is equipped with a dead bee trap from which samples will be collected. The other colony is equipped with a pollen trap from which pollen samples will be collected.

Instructions will be issued later for making routine collections of pollen, honey, and brood. In the interim, Dr. W. C. Roberts, ENT, will make these collections. It is anticipated that permanent personnel will receive special training and instructions by Dr. Roberts for making these collections at a future date.

Collect and record dead bees daily. Consolidate each daily collection in a deepfreeze for shipment to Gulfport weekly. Record daily mortality on Form No. 2.

The data for Form No. 3 will be required for the accumulated daily mortality for chemical analysis.

When daily mortality exceeds ten times the average, preserve this collection separately in the deepfreeze. Complete Form No. 3 with explanation. Provide any information as to cause of increased mortality such as Block "X" treated with endrin or methyl parathion preceding date, etc.

G. Biological indication of pesticide drift:

Make observations on nontarget crop areas, pastures, fallow, etc., to establish condition of plants prior to time of application of herbicides or defoliants. After application of herbicides or defoliants, walk through and assess effect. Record effects observed and distance from target area. Collect and submit foliage samples to support observations. Make observations weekly.

H. Indicators of biological magnification of residues:

This work will be in addition to indicators taken from soil samples under C and mice under E-6. Collect indicators, two samples in each area, once per month. Label, freeze immediately, and ship to laboratory according to instructions. Biological specimens for this purpose should be shipped as soon as possible. Indicators will include:

1. Minnows
2. Tadpoles
3. Water turtles
4. Aquatic algae

IV. Weather Data:

- A. Place rain guage and Standard U. S. Weather Bureau shelters in each area. Record precipitation daily.
- B. Complete weather recording stations with hygrothermographs are expected to arrive for use in each area. In the interim, temperature readings may be obtained from local weather stations.
- C. Wind:

Wind guage readings should be taken and recorded whenever treatments are observed in the areas. If spraying is carried on throughout the day, several readings at different time intervals will be made.

CAUTION:

High potency pesticides are being applied in some of the study areas.

All employees should guard against hazardous exposure. Follow recommendations in Agricultural Handbook 120 and plan work so these instructions can be followed.

Gulfport, Mississippi

July 2, 1964

1907

... ..
... ..
... ..

...

...

...

METHODS OF CHEMICAL ANALYSIS

Condensed procedures used in chemical analysis given in this report are presented on the following pages. It is well to emphasize at this point that pesticide residue analysis is dynamic, constantly changing, as new methods and techniques are developed. The latest and best equipment available has been used in this study. Recent acquisitions include equipment which will permit more rapid and precise analysis of the phosphate insecticides.

Perhaps the greatest development effort is being put forth in the techniques used in clean-up of samples. Some of the methods in use do not provide 100 percent recovery of pesticide residues from the media sampled. Every effort is being made to improve this situation and at the same time permit better separation of the extraneous materials that often accompany the pesticide residues upon extraction.

Cooperative relationship is maintained with Federal, State, and industrial laboratories so that as improved techniques are developed they may be put into use.

The changing methods and techniques bring about another problem; that is, interpretation of old data in light of new. In the present case, many hundreds of the samples were re-examined and new data, if obtained, are included in this report.

The most persistent problems in this residue study centered around interferences. Some of the solvents in use, unless carefully purified and redistilled, give signals on the gas chromatograph which are recorded in the same way as aldrin. There must be constant vigilance, and each batch of solvent must be checked before use. To make matters somewhat more complicated, elemental sulfur, which occurs naturally in many samples, accentuates the aldrin signal so that one may easily be confused into believing the sample is "loaded" with aldrin. Actually this double problem lends itself to solution readily by thin-layer chromatographic clean-up.

Another point of considerable magnitude has been the mutual interference of dieldrin and DDE (a breakdown product of DDT). Here again, thin-layer techniques or column chromatography provide good separation.

One of the problems not recognized until recently in the laboratory was the interference of o,p-DDT (an isomer occurring in the manufacture of DDT) with the analysis of endrin on the gas chromatograph. Thin-layer separation easily solved this interference difficulty, but at the same time caused re-examination of all earlier data. All analyses herein reported have been re-examined in this light.

The presence of an undetermined chlorinated hydrocarbon, suspected to be toxaphene and/or Strobane, at significant levels in numerous soil and silt samples has pointed out the need for study by the analytical staff on the determination of these two insecticides. A technique utilizing thin-

layer technique for separation and colorimetric methods for quantification is being developed and studied. In this preliminary report, however, determinations of toxaphene and/or Strobane are not included.

In order to meet the goals established at the beginning of the program, certain arbitrary limits of definition had to be set. For soils, silt, crops, and biological samples, any chlorinated hydrocarbon residue which is less than 0.1 p.p.m. is recorded as a trace and less than 0.05 is not reported. For water, these limits are a trace if less than 0.1 p.p.b. and less than 0.05 p.p.b. is not reported. The reasons are based on the difficulty in positively identifying any residue below these limits. If the needs of the program in the future determine that these limits should be changed, adjustments will be made.

EQUIPMENT

The following equipment was used in this study:

1. F & M Model 810 gas chromatograph equipped with flame, thermocouple and electron capture detectors.
2. Two Jarrell-Ash Model 28730 gas chromatographs equipped with electron capture detectors.
3. Three Spectronic 20 colorimeters.
4. Two complete thin-layer kits by Brinkman.
5. Perkin-Elmer Model 221 infrared spectrophotometer with KBr pellet press and micro cells.

6. Complete grinding, mixing, and extraction equipment for processing of samples, such as Ohio silage cutter, hammer mill, burr mill, Waring blenders, concentric rotators, U. S. Stoneware ball mills, and the like.

ANALYSIS OF SOIL

Soil for analysis is screened to remove matter such as roots and stones and to insure uniformity of the sample. A subsample of 100 gms. is taken to determine the moisture content. This is heated in an oven at 125°C until there is no further weight loss. The percentage of moisture is then determined.

Then 300 gms. of the soil, based on dry weight, is placed into a 0.5 gallon Mason extraction jar and 600 ml. of 3:1 hexane-isopropanol solvent added. A new cap is placed on the jar and the jar sealed. The sample identification number must be placed on the extraction jar and every other container into which the sample, or portions of the sample, are placed.

The extraction jar is concentrically rotated at 30 r.p.m. for 4 hours. After allowing to stand to permit settling, approximately 200 ml. of extract solution is filtered into a 500 ml. separatory funnel. The solution is washed twice with distilled water. The water washings and any "cuff" remaining at the interface are discarded. The remainder of the washed solution is drawn off into the laboratory sample jar. At this point, each ml. of solvent contains extract from 0.67 gms. of soil.

239

1890. The first of the year was a very dry one, and the
crops were much injured. The weather was very hot,
and the crops were much injured. The weather was very hot,
and the crops were much injured.

The weather was very hot, and the crops were much injured.
The weather was very hot, and the crops were much injured.
The weather was very hot, and the crops were much injured.
The weather was very hot, and the crops were much injured.

The weather was very hot, and the crops were much injured.
The weather was very hot, and the crops were much injured.
The weather was very hot, and the crops were much injured.
The weather was very hot, and the crops were much injured.

The weather was very hot, and the crops were much injured.
The weather was very hot, and the crops were much injured.
The weather was very hot, and the crops were much injured.
The weather was very hot, and the crops were much injured.

For a preliminary survey, 5 lambdas (microliters) of solution are injected into gas chromatograph equipped with a 4 ft. glass column containing 5 percent SE 30 on chromosorb W. Temperature of column is maintained at 185°C, the injector port at 220°C, and the electron capture detector at 200°C. Amplification of the instrument is set to provide half scale deflection of the recorder with 5 nanograms of aldrin.

The preliminary survey will complete all samples that are blank; that is, those which do not produce inflection of the disc integrator with the injection used.

In many instances, no further confirmation will be required if a few well defined peaks are present and the retention time exactly fits standards, and there is a history of use of the particular pesticide involved. Such would be the case with lindane, DDT, and heptachlor.

If a peak is present for aldrin and none for dieldrin, then aldrin must be confirmed by further analysis. Confirmation of aldrin is realized through the use of thin-layer technique of Warrington, Schutzmann, and Barthel (1). At this point it is well to call attention to the interference caused by sulfur at aldrin retention time with the column recommended above. (Schutzmann, Ford, and Barthel (2)).

Using the present column, dieldrin and DDE have identical retention times. These two pesticides may be separated according to the Food and Drug

technique, using Florisil column (3), or by thin-layer (1). The Florisil does not lend itself to a large number of samples and is subject to much irregularity due to inactivation of the Florisil by soil constituents. After separation by either method, the eluates are concentrated to known volume and injected into gas chromatograph as before. The peaks can now be positively identified.

Handwritten text at the top of the page, possibly a title or header.

Main body of handwritten text, consisting of several lines of cursive script.

ANALYSIS OF WATER

Water is delivered to the sample processing laboratory in 5-gallon bottles. These bottles are weighed and the water decanted into an extraction bottle, using care to not disturb the sediment in the sample bottle unduly. Then the sample bottle is reweighed. Calculation then gives the weight of the water to be extracted. Then 1,000 mls. of 3:1 redistilled pentane-ether solution is added to the extraction bottle. After closure, the extraction bottle is rotated 20 minutes at 30 r.p.m. The hydrocarbon solution is then decanted to a sample flask by syphon arrangement. The solution is concentrated to 10 mls. and a 5 lambdas injection made to determine presence or absence of insecticide, as in the soil analysis.

If insecticides are present, the sample is returned to the laboratory for separation, through thin-layer, of the "drin" family of insecticides from the DDT family. After separation and extraction from the absorbent, the separated concentrates are diluted to known volume and re-examined on the gas chromatograph.

ANALYSIS OF SILT

Silt, sludge, sediment, and the like, which represent soil carried and deposited by water, are analyzed in much the same manner as soil except for the extraction step.

Three hundred gms. of silt, after thorough mixing and following removal of sticks, stones, and plant matter of greater than 10 mm. in diameter, is weighed into the 0.5 gallon Mason extraction jar. To this is added 600 mls. of 3:1 redistilled hexane-isopropanol solution. Then about 150 gms. of anhydrous sulfate is added. The mixture is then rotated

concentrically at 30 r.p.m. for 4 hours.

If it is desired to report analysis on dry weight, a subsample is taken at the same time as the above for moisture determination.

Following the extraction step above, the steps to be followed are the same as those for soil.

PROCEDURES FOR DETERMINATION OF PESTICIDES IN BIOLOGICAL SAMPLES

Honey and Nectar

Weigh 20 gms. of honey into 50 ml. beaker. Transfer into separatory funnel, using 40 ml. redistilled pentane. Shake for 1 minute. Allow to separate, aliquot 20-25 mls. of pentane solution off top. Do not allow any honey solution to get into pipette when drawing off pentane solution. If honey is thick, add 5 to 10 mls. distilled water to thin it for a good mixture. If it is necessary to use water, add a small quantity of sodium sulfate to pentane aliquot to dry sample which is now ready for analysis on gas chromatograph.

When known amounts of insecticides (aldrin, BHC, dieldrin, endrin, and heptachlor) were added to honey, 70 to 80 percent of them were recovered by the above procedure. No interference was observed down to the 0.05 p.p.m. level.

Honey Containing Beeswax

Weigh 2" wide strip of paper. Spot honey from wax on paper. Reweigh to get net weight of sample. Develop paper chromatograph in redistilled

1. The first step is to identify the problem.

2. The second step is to define the objectives.

3. The third step is to develop a plan.

4. The fourth step is to implement the plan.

5. The fifth step is to evaluate the results.

6. The sixth step is to report the findings.

7. The seventh step is to draw conclusions.

8. The eighth step is to make recommendations.

9. The ninth step is to implement the recommendations.

10. The tenth step is to monitor the progress.

11. The eleventh step is to evaluate the progress.

12. The twelfth step is to report the progress.

13. The thirteenth step is to draw conclusions.

14. The fourteenth step is to make recommendations.

15. The fifteenth step is to implement the recommendations.

16. The sixteenth step is to monitor the progress.

17. The seventeenth step is to evaluate the progress.

18. The eighteenth step is to report the progress.

19. The nineteenth step is to draw conclusions.

20. The twentieth step is to make recommendations.

methanol bath and allow solvent front to travel to top of paper. Cut off top 3" of paper and put into centrifuge tube with 10 mls. redistilled pentane. Shake for 1 minute and remove paper. Pentane solution is then ready to inject into gas chromatograph.

Bees

Five gms. of bees are blended in isopropanol for one minute. Transfer to separatory funnel using 200 mls. pentane. Wash twice with distilled water to remove isopropanol. Aliquot 50 mls. of pentane solution and process through Murphy-Corley column as follows:

Add 100 mls. 15% ether to clean column. Add 100 mls. redistilled pentane. Add sample and as solvent approaches dryness, add 200 mls. 6% ether to eluate first fraction. As this solvent approaches dryness, add 200 mls. to eluate second fraction. Evaporate to 10 mls. The samples are then ready for analysis on gas chromatograph.

Soil Invertebrates (white grubs, wireworms, earthworms)

Wash insects externally with acetone by flushing or dipping. Dry under air bath. Weigh sample. Grind in mortar with pestle, using 10 mls. redistilled acetone. Filter into test tube and bring to dryness with 40°C air bath.

Add 10 mls. redistilled pentane and shake well. Allow to settle and decant, leaving any oils or fats that separate.

Do column clean-up, using Murphy-Corley column. Elute consecutively with 200 mls. of 6% and 15% ether in pentane. Evaporate both fractions to 10

mls. Sample is now ready for injection in gas chromatograph.

Algae

Weigh large, fluted filter paper. Filter algae and discard washings.

Allow algae on filter paper to air-dry. Trim filter paper around algae.

Weigh out 50 grams; freeze balance for possible future use.

Blend the 50 gms. sample in Waring Blender with 250 mls. of redistilled isopropanol for 3 minutes. The mixture is then transferred to 0.5 gallon extraction jar with 750 mls. of redistilled pentane. After careful mixing, the solutions are filtered.

At this point the analysis proceeds exactly as for grass (see below).

Pollen

Grind pollen in mortar with pestle, using 5 mls. per gm. of redistilled isopropanol. Add 5 mls. per gm. redistilled pentane.

From this point on, the procedure is the same as for grass.

6-A

6-B

7-A

Grass

Fifty grams of grass is blended with 250 mls. of isopropanol* and transferred to a half-gallon fruit jar with 750 mls. of pentane. The sample is then concentrically rotated 4 hours on a ferris wheel type rotator.

Forty mls. of the extract from grass, representing 2 grams of original sample, is washed twice with distilled H₂O to remove the alcohol. After removal of the alcohol, the extract is cleaned up on the Murphy-Corley chromatographic column. The Murphy-Corley column is prepared as follows:

- a. Add $\frac{1}{4}$ inch Na₂SO₄ to a chromatographic column.
- b. Add 10 gms. activated Florisil to the column with gentle tapping.
- c. Add 10 gms. of 15:2 Florisil-carbon (Nuchar) to the column with gentle tapping.
- d. Add 5 gms. activated Florisil to column with gentle tapping.
- e. Add $\frac{1}{2}$ inch Na₂SO₄ to the column.

The column is washed with 100 mls. of 15% ethyl ether in pentane and then with 100 mls. pentane. When the pentane wash solution reaches the top of the Na₂SO₄ layer, the sample extract of 10-20 mls.** is added to the column. (The first fraction is collected from this point). When the level of the 6% ether in pentane reaches the top of the Na₂SO₄ layer, 200 mls. of the 15% ether in pentane is added to the column and collection of the second

* All solvents must be redistilled.

** The sample extract should be concentrated to 10-20 mls. before the column is prepared.

fraction is begun. After collection of the fractions, each is concentrated to 5 mls. before injection on the GLC column. The 5 mls. containing the sample may be clarified with Nuchar-Attaclay adsorbent if needed.

If it is desired to lower the limits of the p.p.m., the eluant may be concentrated to 1 ml. For several of the commonly used chlorinated hydrocarbon insecticides on grass, this procedure can be used in the range of concentration as low as 10 to 50 parts per billion.

Other Biological Samples

Recognized methods are being followed for extraction and analysis of crop and indicator animal samples such as turtles, minnows and frogs. Improvements in methods of analysis for these types of samples are being developed.

അതുകൊണ്ട്, ഞങ്ങൾ, അതിനോട് ചേർന്ന് നിൽക്കുന്നവർക്ക്

ഈ പ്രശ്നങ്ങൾ പരിഹരിക്കാൻ സഹായിക്കാൻ ആഗ്രഹിക്കുന്നു.

... അതിനായി, ഞങ്ങൾ, ഞങ്ങളുടെ പങ്കാളികളെ സഹായിക്കാൻ ആഗ്രഹിക്കുന്നു.

അതിനായി, ഞങ്ങൾ, ഞങ്ങളുടെ പങ്കാളികളെ സഹായിക്കാൻ ആഗ്രഹിക്കുന്നു.

അതിനായി, ഞങ്ങൾ, ഞങ്ങളുടെ പങ്കാളികളെ സഹായിക്കാൻ ആഗ്രഹിക്കുന്നു.

അതിനായി, ഞങ്ങൾ, ഞങ്ങളുടെ പങ്കാളികളെ സഹായിക്കാൻ ആഗ്രഹിക്കുന്നു.

അതിനായി, ഞങ്ങൾ, ഞങ്ങളുടെ പങ്കാളികളെ സഹായിക്കാൻ ആഗ്രഹിക്കുന്നു.

അതിനായി, ഞങ്ങൾ, ഞങ്ങളുടെ പങ്കാളികളെ സഹായിക്കാൻ ആഗ്രഹിക്കുന്നു.

അതിനായി, ഞങ്ങൾ, ഞങ്ങളുടെ പങ്കാളികളെ സഹായിക്കാൻ ആഗ്രഹിക്കുന്നു.

അതിനായി, ഞങ്ങൾ, ഞങ്ങളുടെ പങ്കാളികളെ സഹായിക്കാൻ ആഗ്രഹിക്കുന്നു.

Literature Cited

1. Warrington, J. A., R. L. Schutzmann, and W. F. Barthel. Thin-layer Chromatography as a Supplement to Gas-Liquid Chromatography in the Routine Analysis of Pesticide Residues. Submitted for approval. 1964.
2. Schutzmann, R. L., J. Ford, and W. F. Barthel. Sulfur as an Interfering Substance in Gas-Liquid Chromatography of Pesticide Residues. In preparation. 1964.
3. Barry, H., and J. Hundley. Pesticide Analytical Manual. Methods which Detect more than one Pesticide Residue. July 1963.
4. Schutzmann, R. L., and W. F. Barthel. Determination of Aldrin and Dieldrin Residues in Soil by Thin-Layer Chromatography. Submitted for approval. 1964.

6-A

6-B

7-A

Doc

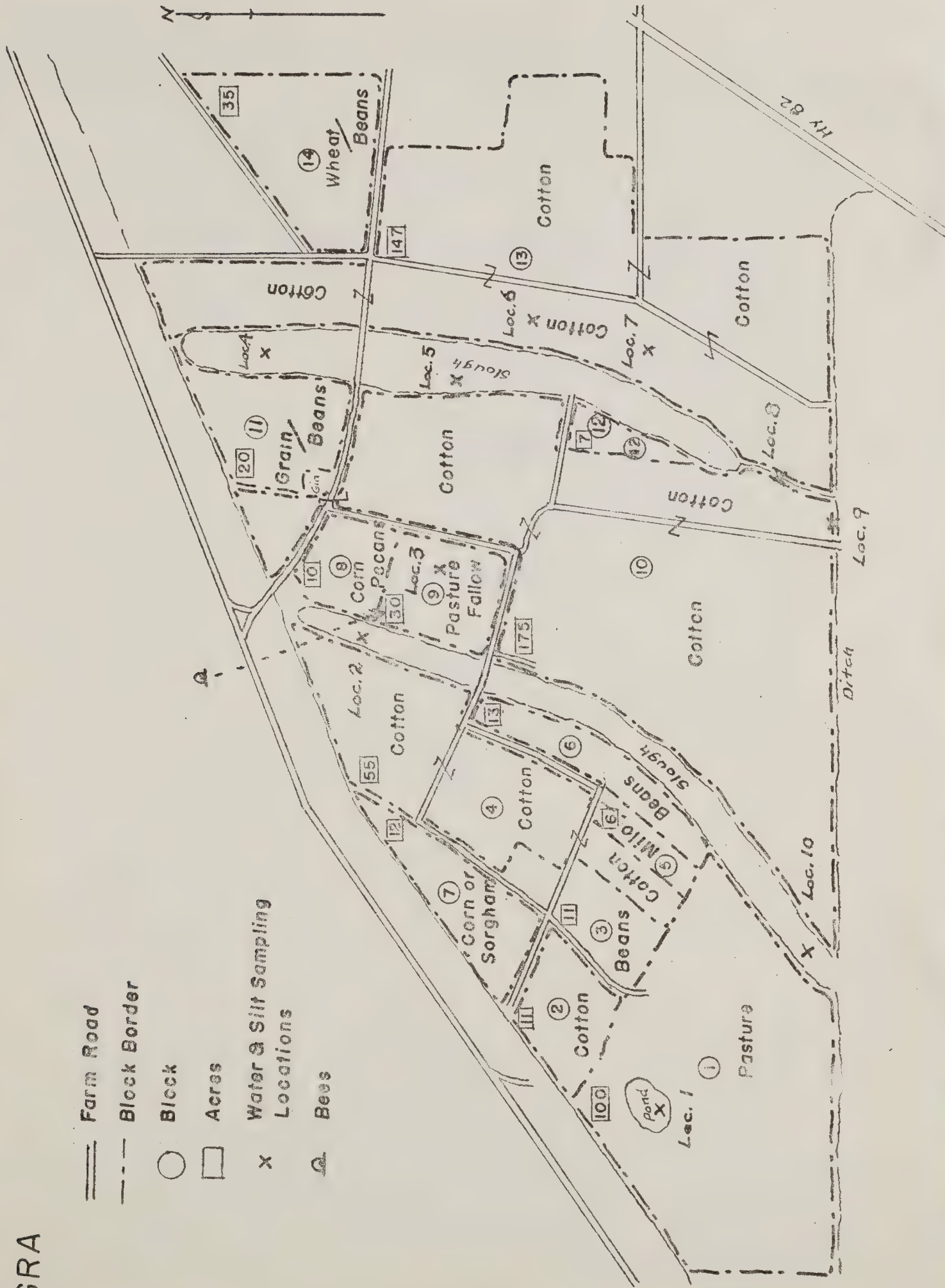
== Farm Road
 --- Block Border

○ Block

□ Acres

x Water & Silt Sampling Locations

Ⓐ Bees



LEGEND

Analysis incomplete - These samples will be re-examined
in light of improved techniques.

Arsenic - All arsenic analyses are reported
as metallic arsenic. If no figure
is given, it means that arsenic was
not run on that particular sample.

N - Less than 0.05 p.p.b. in water, or
less than 0.05 p.p.m. in other
samples. If only arsenic analysis
is reported, it means that the
sample was negative for chlorinated
hydrocarbons.

p.p.b. - Parts per billion.

p.p.m. - Parts per million.

T - Trace is less than 0.10 p.p.b. in
water, or less than 0.10 p.p.m.
in all other samples.

Note: Analysis of phosphates were made only on
selected samples.

6-R
7-A

CHEMICAL TREATMENT HISTORY
Pounds of Technical Material Per Acre

GRA - Blocks Containing Cotton Prior to 1959

Date Applied	Methyl					Toxaphene	TEPP	Remarks
	Aldrin	BHC	DDT	Dieldrin	Endrin	Parathion	Malathion	
1948- 1951		0.30	1.00					6-8 Applications
1952		0.30	1.00					5 Applications
	0.25							3 Applications
	0.16							3 Applications
1953		0.30	1.00					3 Applications
	0.25		1.00					3 Applications
	0.16							2 Applications
	0.08							2 Applications
1954							0.25	1 Application
							Unknown	1 Application
		0.30	1.00					5 Applications
				0.15				3 Applications
				0.10				1 Application
				0.05				2 Applications
							2.00	1 Application

CHEMICAL TREATMENT HISTORY
Pounds of Technical Material Per Acre

2

GRA - Blocks Containing Cotton Prior to 1959 (Continued)

Date Applied	Aldrin	BHC	DDT	Dieldrin	Endrin	Methyl		Toxaphene	TEPP	Remarks
						Parathion	Malathion			
1955		0.30	1.00							6 Applications
				0.15						4 Applications
				0.10						2 Applications
				0.05						2 Applications
1956					0.20		0.50			2 Applications
					0.20					8 Applications
					0.30					3 Applications
1957					0.20		0.50			15 Applications
					0.14		0.50			2 Applications
							0.25			1 Application
1958					0.20	0.25				13 Applications
					0.14	0.16				3 Applications
					0.07	0.08				1 Application

V-L R-9

CHEMICAL TREATMENT HISTORY
Pounds Of Technical Material Per Acre

GRA - Block 1 (100 Acres of pasture and pond)	Date applied	Remarks
1959-1964		None applied.

THE HISTORY OF THE
CITY OF BOSTON

BY
JOHN H. COLEMAN

GRA - Soil Samples

GRA - Block 1

Date sampled 1964	Log number	Pesticides found ppm
6/3	G4-79	4.7 Arsenic
6/3	80	3.9 Arsenic
7/1	353	3.9 Arsenic
7/1	354	3.4 Arsenic
7/20	852	2.2 Arsenic
7/20	853	3.1 Arsenic
8/10	1380	4.6 Arsenic
8/10	1381	3.2 Arsenic
9/8	2073	N
9/8	2075	T Methyl Parathion

G-R
7-A

Table of Contents

Page	Chapter	Section
1	1	1.1
2	2	2.1
3	3	3.1
4	4	4.1
5	5	5.1
6	6	6.1
7	7	7.1
8	8	8.1
9	9	9.1
10	10	10.1
11	11	11.1
12	12	12.1
13	13	13.1
14	14	14.1
15	15	15.1
16	16	16.1
17	17	17.1
18	18	18.1
19	19	19.1
20	20	20.1
21	21	21.1
22	22	22.1
23	23	23.1
24	24	24.1
25	25	25.1
26	26	26.1
27	27	27.1
28	28	28.1
29	29	29.1
30	30	30.1
31	31	31.1
32	32	32.1
33	33	33.1
34	34	34.1
35	35	35.1
36	36	36.1
37	37	37.1
38	38	38.1
39	39	39.1
40	40	40.1
41	41	41.1
42	42	42.1
43	43	43.1
44	44	44.1
45	45	45.1
46	46	46.1
47	47	47.1
48	48	48.1
49	49	49.1
50	50	50.1
51	51	51.1
52	52	52.1
53	53	53.1
54	54	54.1
55	55	55.1
56	56	56.1
57	57	57.1
58	58	58.1
59	59	59.1
60	60	60.1
61	61	61.1
62	62	62.1
63	63	63.1
64	64	64.1
65	65	65.1
66	66	66.1
67	67	67.1
68	68	68.1
69	69	69.1
70	70	70.1
71	71	71.1
72	72	72.1
73	73	73.1
74	74	74.1
75	75	75.1
76	76	76.1
77	77	77.1
78	78	78.1
79	79	79.1
80	80	80.1
81	81	81.1
82	82	82.1
83	83	83.1
84	84	84.1
85	85	85.1
86	86	86.1
87	87	87.1
88	88	88.1
89	89	89.1
90	90	90.1
91	91	91.1
92	92	92.1
93	93	93.1
94	94	94.1
95	95	95.1
96	96	96.1
97	97	97.1
98	98	98.1
99	99	99.1
100	100	100.1

BIOLOGICAL RECORD

SWEEP NET

BLOCK 1-PASTURE

		Totals Per 100 Sweeps-One Collection Per Week									
Indicator	:	June 18	June 25	July 2	July 9	July 13	July 23	July 30	Aug.		
Species	:										
Grasshoppers	:	3	0	62	3	3	57	4	2		
Lady beetles	:	0	3	1	0	0	0	0	0		
Bumble bees	:	0	0	0	0	0	0	0	0		

	:	Aug. 13	Aug. 20	Aug. 25	Sept. 2	Sept. 7	Sept. 14	Sept. 21	Oct.		
	:										
Grasshoppers	:	2	0	0	1	3	3	0	3		
Lady beetles	:	0	0	0	0	0	1	0	0		
Bumble bees	:	0	0	0	0	0	0	0	0		
	:										

GRA

000

000

000

000

000

000

000

70

100

100

100

100

100 100 100 100 100 100 100

100 100 100

100 100

100 100 100

BIOLOGICAL RECORD

PITFALL TRAPS

BLOCK 1-PASTURE

Indicator Species	Total Number Per Composite (3 Traps) Sample-Collected Bi-Weekly									
	July 18*		July 21		Aug. 19		Sept. 1		Sept. 16	
	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
Ants	0		10	6	0	0	0	3	5	0
Spiders	3		0	2	0	1	1	1	0	0
Ground beetles	2		0	2	0	0	0	0	0	0
Earwigs	0		0	0	0	0	0	0	0	0
Rove beetles	0		0	0	0	0	0	1	0	1
Field crickets	1		2	1	2	3	0	0	0	0

*Only one sample taken.

S1=Sample One
S2=Sample Two

GRA

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1221	1222	1223	1224	1225	1226	1227	1228	1229	1230	1231	1232	1233	1234	1235	1236	1237	1238	1239	1240	1241	1242	1243	1244	1245	1246	1247	1248	1249	1250	1251	1252	1253	1254	1255	1256	1257	1258	1259	1260	1261	1262	1263	1264	1265	1266	1267	1268	1269	1270	1271	1272	1273	1274	1275	1276	1277	1278	1279	1280	1281	1282	1283	1284	1285	1286	1287	1288	1289	1290	1291	1292	1293	1294	1295	1296	1297	1298	1299	1300	1301	1302	1303	1304	1305	1306	1307	1308	1309	1310	1311	1312	1313	1314	1315	1316	1317	1318	1319	1320	1321	1322	1323	1324	1325	1326	1327	1328	1329	1330	1331	1332	1333	1334	1335	1336	1337	1338	1339	1340	1341	1342	1343	1344	1345	1346	1347	1348	1349	1350	1351	1352	1353	1354	1355	1356	1357	1358	1359	1360	1361	1362	1363	1364	1365	1366	1367	1368	1369	1370	1371	1372	1373	1374	1375	1376	1377	1378	1379	1380	1381	1382	1383	1384	1385	1386	1387	1388	1389	1390	1391	1392	1393	1394	1395	1396	1397	1398	1399	1400	1401	1402	1403	1404	1405	1406	1407	1408	1409	1410	1411	1412	1413	1414	1415	1416	1417	1418	1419	1420	1421	1422	1423	1424	1425	1426	1427	1428	1429	1430	1431	1432	1433	1434	1435	1436	1437	1438	1439	1440	1441	1442	1443	1444	1445	1446	1447	1448	1449	1450	1451	1452	1453	1454	1455	1456	1457	1458	1459	1460	1461	1462	1463	1464	1465	1466	1467	1468	1469	1470	1471	1472	1473	1474	1475	1476	1477	1478	1479	1480	1481	1482	1483	1484	1485	1486	1487	1488	1489	1490	1491	1492	1493	1494	1495	1
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	---

BIOLOGICAL RECORD

SOIL SAMPLES

BLOCK 1-PASTURE

Totals Per Sample-Five 5-Inch Cores (One Foot Deep) Collected Monthly									
Indicator Species	July 9		July 16		Aug. 19		Sept. 24		
	S1	S2	S1	S2	S1	S2	S1	S2	
White Grubs	1	0	0	0	0	0	0	0	
Wireworms	1	0	0	0	0	0	0	0	
Earthworms	0	0	0	0	0	0	0	0	

S1=Sample One
S2=Sample Two

GRA

CHEMICAL TREATMENT HISTORY
Pounds Of Technical Material Per Acre

GRA - Block 2 (11 Acres of cotton)

Date applied	Anhydrous Ammonia	Carbaryl	DDT	Endrin	Methyl Parathion	Toxaphene	Merphos	Remarks
1960					0.08			1 Application.
				0.14	0.16			2 Applications.
				0.2	0.25			7 Applications.
1961					0.08			2 Applications.
				0.14	0.16			1 Application
				0.2	0.25			11 Applications.
1962				0.07	0.08			1 Application.
				0.14	0.16			3 Applications.
				0.2	0.25			8 Applications.
1963					0.08	1.0		1 Application.
				0.14	0.16			2 Applications.
				0.2	0.25			10 Applications.
				0.3				1 Application.
				0.3	0.4			2 Applications.
				0.4	0.5			1 Application.
1964								
5/18	100.0				0.166	1.0		
5/25					0.166	1.0		
6/4				0.25	0.2			
6/18			0.6		0.8			
7/23				0.2	0.25			
8/6				0.32	0.32			
8/19				0.32	0.32			
8/27				0.32	0.32			
9/3				0.32	0.32			
9/9				0.32	0.32			
9/18				0.32	0.32			
9/18				0.32	0.32			
							0.375	

WESTERN ELECTRIC COMPANY
CINCINNATI, OHIO 45202

100-100000

100-100000
100-100000
100-100000

100-100000
100-100000
100-100000

100-100000

100-100000

100-100000

100-100000

100-100000

GRA - Soil Samples

GRA - Block 2

Date sampled 1964	Log number	Pesticides found ppm
6/2	G4-81	T Lindane 1.62 p,p DDT 0.19 o,p DDT 0.2 DDE 3.0 Arsenic
6/2	82	1.2 p,p DDT 0.25 DDE 2.7 Arsenic
6/26	355	2.2 p,p DDT 0.81 o,p DDT 0.29 DDE 4.1 Arsenic
6/26	356	2.09 p,p DDT 0.41 o,p DDT 0.27 DDE 4.6 Arsenic
7/15	634	0.74 p,p DDT 0.4 o,p DDT 0.2 DDE 5.6 Arsenic
7/15	635	0.87 p,p DDT 0.47 o,p DDT 0.25 DDE 3.3 Arsenic
8/10	1382	0.61 p,p DDT 0.37 o,p DDT 0.18 DDE 0.21 Endrin 4.7 Arsenic 4.7 Arsenic
8/10	1383	1.54 p,p DDT 0.66 o,p DDT 0.22 DDE 7.0 Arsenic

GRA - Soil Samples

GRA - Block 2 (Cont'd.)

<u>Date sampled</u> <u>1964</u>	<u>Log</u> <u>number</u>	<u>Pesticides found</u> <u>ppm</u>
9/8	G4-2076	0.64 p,p DDT T Dieldrin 0.3 Endrin
9/8	2079	0.75 p,p DDT 0.46 o,p DDT 0.18 DDE 0.04 Methyl Parathion

5-8
7-4

BIOLOGICAL RECORD

SWEEP NET

BLOCK 2-COTTON

		Totals Per 100 Sweeps-One Collection Per Week									
Indicator	:	June	June	July	July	July	July	Sept.	Sept.	Sept.	Aug.
Species	:	20	25	2	6	13	30	22	15*	22	5
Grasshoppers	:	0	0	1	0	0	0	0	0	0	0
Lady beetles	:	0	0	0	0	1	0	0	0	0	0
Bumble bees	:	0	0	0	0	0	0	0	0	0	0

	:	Aug.	Aug.	Aug.	Sept.	Sept.	Sept.	Sept.	Oct.		
	:	13	21	25	31	7	15*	22	5		
Grasshoppers	:	0	0	0	0	0	0	0	0	0	0
Lady beetles	:	0	0	0	0	0	0	0	0	0	0
Bumble bees	:	0	0	0	0	0	0	0	0	0	0
	:										

*Field disced-only stubbles left

GRA

CHEMICAL TREATMENT HISTORY
Pounds Of Technical Material Per Acre

GRA - Block 3 (11 Acres of soybeans)

Date applied	Carbaryl	Endrin	Methyl Parathion	Remarks
1960		0.14 0.2	0.08 0.16 0.25	1 Application. 2 Applications. 7 Applications.
1961		0.14 0.2	0.08 0.16 0.25	2 Applications. 1 Application. 11 Applications.
1962-1963				None applied.

1964
9/18
1.5

GRA - Soil Samples

GRA - Block 3

Date sampled 1964	Log number	Pesticides found ppm
6/2	G4-83	T Lindane 1.48 p,p DDT 0.2 o,p DDT 0.59 DDE 5.4 Arsenic
6/2	84	1.17 p,p DDT 0.19 o,p DDT 0.27 DDE 2.9 Arsenic
6/26	357	0.84 p,p DDT 0.19 o,p DDT 5.7 Arsenic
6/26	358	0.72 p,p DDT 0.19 DDE 2.6 Arsenic
7/15	636	0.27 p,p DDT 0.12 o,p DDT 0.11 DDE 5.1 Arsenic
7/15	637	0.25 p,p DDT 0.15 o,p DDT 0.12 DDE 4.6 Arsenic
8/29	1921	1.0 p,p DDT 0.7 o,p DDT 0.2 DDE T Dieldrin T Endrin
8/29	1922	T Lindane 0.3 p,p DDT 0.9 o,p DDT 0.3 DDE 0.12 Dieldrin T Endrin 0.03 Methyl Parathion

2100000 0.2

2100 0.2 0.0

2100 0.2 0.0

2100 0.2 0.0

2100 0.2 0.0

2100 0.2 0.0

2100 0.2 0.0

2100 0.2 0.0

2100 0.2 0.0

2100 0.2 0.0

2100 0.2 0.0

2100 0.2 0.0

2100 0.2 0.0

2100 0.2 0.0

2100 0.2 0.0

2100 0.2 0.0

2100 0.2 0.0

2100 0.2 0.0

2100 0.2 0.0

2100 0.2 0.0

2100 0.2 0.0

2100 0.2 0.0

2100 0.2 0.0

2100 0.2 0.0

2100 0.2 0.0

2100 0.2 0.0

2100 0.2 0.0

GRA - Soil Samples

GRA - Block 3 (Cont'd.)

Date sampled 1964	Log number	Pesticides found ppm
9/23	G4-2451	0.63 p,p DDT 0.4 o,p DDT 0.2 DDE 0.26 Endrin
9/23	2456	0.83 p,p DDT 0.46 o,p DDT 0.31 DDE 0.22 Endrin
10/6	2623	0.87 p,p DDT 0.6 o,p DDT 0.35 DDE T Dieldrin
10/8	2626	0.73 p,p DDT 0.4 o,p DDT 0.28 DDE T Dieldrin

G-B

7-A

_____ _____ _____ _____ _____
" have an idea _____ _____ _____
_____ _____ _____ _____ _____
_____ _____ _____ _____ _____
_____ _____ _____ _____ _____

BIOLOGICAL RECORD

SWEEP NET

BLOCK 3-SOYBEANS

Indicator Species	Totals Per 100 Sweeps-One Collection Per Week									
	June 20	July 2	July 9	July 13	July 23	July 30	Aug. 5	Aug. 13	Aug. 20	Aug. 25
Grasshoppers	0	0	0	0	0	0	0	0	0	0
Lady beetles	0	0	0	0	0	0	0	0	0	0
Bumble bees	0	0	0	0	0	0	0	0	0	0

	Aug. 13	Aug. 20	Aug. 25	Sept. 2	Sept. 7	Sept. 14	Sept. 22	Oct. 5		
Grasshoppers	0	0	0	1	0	0	0	0	0	0
Lady beetles	0	0	0	1	0	0	0	0	0	0
Bumble bees	0	0	0	0	0	0	0	0	0	0

GRA

CHEMICAL TREATMENT HISTORY
Pounds Of Technical Material Per Acre

GRA - Block 4 (55 Acres of cotton)

Date applied	Anhydrous Ammonia	Calcium Cyanamide	DDT	Diuron	Endrin	Methyl Parathion	Toxaphene	Remarks
1960								
					0.14	0.08		1 Application.
					0.2	0.16		2 Applications.
						0.25		7 Applications.
1961								
					0.14	0.08		2 Applications.
					0.2	0.16		1 Application.
						0.25		11 Applications.
1962								
					0.07	0.08		1 Application.
					0.14	0.16		3 Applications.
					0.2	0.25		8 Applications.
1963							1.0	
					0.14	0.08		1 Application.
					0.2	0.16		2 Applications.
					0.3	0.25		10 Applications.
					0.3			1 Application.
					0.3	0.4		2 Applications.
					0.4	0.5		1 Application.
1964								
5/18	100.0					0.166	1.0	
5/25						0.166	1.0	
6/13			0.6			0.8		
6/18			0.6			0.8		
7/21				0.8				
7/23								
8/13					0.2	0.25		
8/19					0.32	0.32		
8/24					0.32	0.32		
8/24					0.32	0.32		
8/27					0.32	0.32		
9/3					0.32	0.32		
9/9					0.32	0.32		
10/8		17.0			0.32	0.32		

Rained after treatment.
Re-treated same day.

GRA - Soil Samples

GRA - Block 4

Date sampled 1964	Log number	Pesticides found ppm
6/2	G4-85	1.34 p,p DDT 0.19 o,p DDT 0.24 DDE 4.9 Arsenic
6/2	86	0.74 p,p DDT 0.27 o,p DDT 0.26 DDE T Dieldrin T Endrin 0.15 TDE 3.2 Arsenic
6/23	284	0.76 p,p DDT 0.32 o,p DDT 0.25 DDE 3.1 Arsenic
6/23	285	0.66 p,p DDT 0.32 o,p DDT 0.21 DDE 2.8 Arsenic
8/3	1090	T Lindane 0.99 p,p DDT 0.45 o,p DDT 0.35 DDE T Dieldrin T Endrin 3.6 Arsenic
8/3	1091	0.29 p,p DDT 0.12 o,p DDT 0.54 DDE 5.3 Arsenic
8/24	1747	1.19 p,p DDT 0.19 DDE T Endrin
8/24	1748	1.57 p,p DDT 0.71 DDE 0.24 Dieldrin T Endrin
9/21	2454	0.89 p,p DDT 0.49 o,p DDT 0.29 DDE 0.4 Endrin

6-B

7-A

பெயர்

மேல் பகுதி

கீழ் பகுதி

மேல் பகுதி

கீழ் பகுதி

மேல் பகுதி

கீழ் பகுதி

மேல் பகுதி

மேல் பகுதி

கீழ் பகுதி

மேல் பகுதி

கீழ் பகுதி

BIOLOGICAL RECORD

SWEEP NET

BLOCK 4-COTTON

		Totals Per 100 Sweeps-One Collection Per Week									
Indicator	:	June	June	July	July	July	July	July	Sept.	Sept.	Oct.
Species	:	18	25	2	6	16*	23*	30	22	5	5
Grasshoppers	:	1	0	0	0			0		0	0
Lady beetles	:	0	0	0	0			1		1	1
Bumble bees	:	0	0	0	0			0		0	0

	:	Aug.	Aug.	Aug.	Aug.	Sept.	Sept.	Sept.	Sept.	Oct.	
	:	13	21	25	31	7	15	22		5	
Grasshoppers	:	0	0	0	0	0	0	0	0	0	0
Lady beetles	:	0	0	0	0	0	0	0	0	0	0
Bumble bees	:	0	0	0	0	0	0	0	0	0	0
	:										

*No samples taken during week.

GRA

1877, 1878

1879, 1880

1881, 1882

1883, 1884

1885, 1886

1887, 1888

1889, 1890

1891, 1892

1893, 1894

1895, 1896

1897, 1898

1899, 1900

1901, 1902

BIOLOGICAL RECORD

PITFALL TRAPS

BLOCK 4-COTTON

Indicator Species	Total Number Per Composite (3 Traps)										Sample-Collected Bi-Weekly			
	June		July		July		Aug.		Sept.		Sept.		Sept.	
	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
Ants	0				0	0	1	0	0	0	0	0	0	0
Spiders	0				0	0	0	0	0	0	0	3	0	1
Ground beetles	3				4	0	1	4	0	0	1	0	0	0
Earwigs	0				0	0	0	0	0	0	0	0	0	0
Rove beetles	0				0	0	0	0	0	0	0	1	0	0
Field crickets	0				0	0	0	0	0	0	0	0	2	0

*Only one sample taken.

**No sample taken because of layby herbicide at request of owner.

S1=Sample One
S2=Sample Two

GRA

BIOLOGICAL RECORD

SOIL SAMPLES

BLOCK 4-COTTON

		Totals Per Sample-Five 5-Inch Cores (One Foot Deep) Collected Monthly					
Indicator Species		July 7		Aug. 31		Sept. 19	
		S1	S2	S1	S2	S1	S2
White Grubs	:	0	0	0	0	0	0
Wireworms	:	0	0	0	0	0	0
Earthworms	:	0	0	0	0	0	0
	:						

S1=Sample One
S2=Sample Two

GRA

CHEMICAL TREATMENT HISTORY
Pounds Of Technical Material Per Acre

GRA - Block 5 (6 Acres of milo)	
Date applied	Remarks
1959-1964	None applied.

THE UNIVERSITY OF CHICAGO

1967

GRA - Soil Samples

GRA - Block 5

Date sampled 1964	Log number	Pesticides found ppm
6/2	G4-87	T Lindane 0.4 p,p DDT 0.17 DDE 4.3 Arsenic
6/2	88	T Aldrin T Lindane 0.22 p,p DDT T o,p DDT 0.12 DDE T TDE 4.2 Arsenic
6/27	361	0.27 p,p DDT 4.7 Arsenic
6/27	362	0.21 p,p DDT 4.5 Arsenic
7/28	972	0.27 p,p DDT 0.11 o,p DDT 0.14 DDE T Dielldrin 7.2 Arsenic
7/28	973	0.63 p,p DDT 0.39 o,p DDT 0.29 DDE T Dielldrin 5.0 Arsenic
8/20	1597	0.06 Dielldrin
8/20	1598	0.34 p,p DDT 0.15 o,p DDT 0.12 DDE
9/14	2264	1.3 p,p DDT 0.51 o,p DDT 0.39 DDE 0.14 Dielldrin T Endrin
9/14	2265	0.23 p,p DDT T o,p DDT T DDE

BIOLOGICAL RECORD

SWEEP NET

BLOCK 5-MILO

		Totals Per 100 Sweeps-One Collection Per Week									
Indicator	:	June	June	July	July	July	July	July	Sept.	Sept.	Oct.
Samples	:	20	25	2	9	13	23	30	22*	5	5
Grasshoppers	:	0	3	0	0	0	3	0	0	0	0
Lady beetles	:	0	5	5	1	1	1	0	0	0	0
Bumble bees	:	0	0	0	0	0	0	0	0	0	1

	:	Aug.	Aug.	Aug.	Sept.	Sept.	Sept.	Sept.	Sept.	Oct.	
	:	13	20	25	2	7	14	22*	5		
Grasshoppers	:	0	0	0	0	0	0	0	0	0	0
Lady beetles	:	3	0	0	1	0	0	0	0	0	0
Bumble bees	:	0	0	0	0	0	0	0	0	0	0
	:										

*This block disced up.

GRA

COGNATE LINGUISTICS

1974-1975

1974-1975

PLANT	YIELD	YIELD	YIELD	YIELD	YIELD
1	1	1	1	1	1
2	1	1	1	1	1
3	1	1	1	1	1
4	1	1	1	1	1
5	1	1	1	1	1
6	1	1	1	1	1
7	1	1	1	1	1
8	1	1	1	1	1
9	1	1	1	1	1
10	1	1	1	1	1
11	1	1	1	1	1
12	1	1	1	1	1
13	1	1	1	1	1
14	1	1	1	1	1
15	1	1	1	1	1
16	1	1	1	1	1
17	1	1	1	1	1
18	1	1	1	1	1
19	1	1	1	1	1
20	1	1	1	1	1
21	1	1	1	1	1
22	1	1	1	1	1
23	1	1	1	1	1
24	1	1	1	1	1
25	1	1	1	1	1
26	1	1	1	1	1
27	1	1	1	1	1
28	1	1	1	1	1
29	1	1	1	1	1
30	1	1	1	1	1
31	1	1	1	1	1
32	1	1	1	1	1
33	1	1	1	1	1
34	1	1	1	1	1
35	1	1	1	1	1
36	1	1	1	1	1
37	1	1	1	1	1
38	1	1	1	1	1
39	1	1	1	1	1
40	1	1	1	1	1
41	1	1	1	1	1
42	1	1	1	1	1
43	1	1	1	1	1
44	1	1	1	1	1
45	1	1	1	1	1
46	1	1	1	1	1
47	1	1	1	1	1
48	1	1	1	1	1
49	1	1	1	1	1
50	1	1	1	1	1
51	1	1	1	1	1
52	1	1	1	1	1
53	1	1	1	1	1
54	1	1	1	1	1
55	1	1	1	1	1
56	1	1	1	1	1
57	1	1	1	1	1
58	1	1	1	1	1
59	1	1	1	1	1
60	1	1	1	1	1
61	1	1	1	1	1
62	1	1	1	1	1
63	1	1	1	1	1
64	1	1	1	1	1
65	1	1	1	1	1
66	1	1	1	1	1
67	1	1	1	1	1
68	1	1	1	1	1
69	1	1	1	1	1
70	1	1	1	1	1
71	1	1	1	1	1
72	1	1	1	1	1
73	1	1	1	1	1
74	1	1	1	1	1
75	1	1	1	1	1
76	1	1	1	1	1
77	1	1	1	1	1
78	1	1	1	1	1
79	1	1	1	1	1
80	1	1	1	1	1
81	1	1	1	1	1
82	1	1	1	1	1
83	1	1	1	1	1
84	1	1	1	1	1
85	1	1	1	1	1
86	1	1	1	1	1
87	1	1	1	1	1
88	1	1	1	1	1
89	1	1	1	1	1
90	1	1	1	1	1
91	1	1	1	1	1
92	1	1	1	1	1
93	1	1	1	1	1
94	1	1	1	1	1
95	1	1	1	1	1
96	1	1	1	1	1
97	1	1	1	1	1
98	1	1	1	1	1
99	1	1	1	1	1
100	1	1	1	1	1

1974-1975

CHEMICAL TREATMENT HISTORY
Pounds Of Technical Material Per Acre

GRA - Block 6 (13 Acres of soybeans)		
Date applied	Carbaryl	Remarks
1959-1963		None applied.
1964 9/18	1.5	

M

I

I

I

I

I

I

I

1000

1000

1000

GRA - Soil Samples

GRA - Block 6

Date sampled 1964	Log number	Pesticides found ppm
6/3	G4-89	2.7 Arsenic
6/3	90	1.6 Arsenic
6/23	286	4.9 Arsenic
6/23	287	4.2 Arsenic
7/28	974	3.9 Arsenic
7/28	975	2.6 Arsenic
8/31	1926	N
8/31	1927	N
10/8	2622	N
10/8	2625	0.14 p,p DDT T o,p DDT T DDE

Description of work	Job Number	Date of completion
Painting walls	10-20	1-1
Painting walls	10-21	1-1
Painting walls	10-22	1-1
Painting walls	10-23	1-1
Painting walls	10-24	1-1
Painting walls	10-25	1-1
Painting walls	10-26	1-1
Painting walls	10-27	1-1
Painting walls	10-28	1-1
Painting walls 10-29 10-30 10-31	10-29 10-30 10-31	1-1 1-1 1-1

BIOLOGICAL RECORD

SWEEP NET

BLOCK 6-SOYBEANS

		Totals Per 100 Sweeps-One Collection Per Week									
Indicator	:	June	June	July	July	July	July	Sept.	Sept.	Sept.	Oct.
Species	:	20	25	2	9	13	23	22	15	22	5
Grasshoppers	:	0	0	0	0	2	1	0	1	0	1
Lady beetles	:	0	0	0	0	0	1	0	1	0	1
Bumble bees	:	0	0	0	0	0	0	0	0	0	0

	:	Aug.	Aug.	Aug.	Sept.	Sept.	Sept.	Sept.	Sept.	Sept.	Oct.
	:	13	20	25	2	7	15	22	15	22	5
Grasshoppers	:	0	0	0	2	2	0	0	0	0	0
Lady beetles	:	0	0	0	0	0	0	0	0	0	0
Bumble bees	:	0	0	0	0	0	0	0	0	0	0

GRA

CHEMICAL TREATMENT HISTORY
Pounds Of Technical Material Per Acre

GRA - Block 7 (12 Acres of milo)

Date applied	Remarks
--------------	---------

None applied.

1959-1964

GRA - Soil Samples

GRA - Block 7

Date sampled 1964	Log number	Pesticides found ppm
6/3	G4-91	0.73 p,p DDT 0.17 DDE 4.6 Arsenic
6/3	92	0.48 p,p DDT 0.1 DDE 4.8 Arsenic
6/24	288	0.27 p,p DDT 0.13 DDE 4.2 Arsenic
6/24	289	0.27 p,p DDT 0.17 DDE 5.4 Arsenic
7/15	638	T Lindane 0.3 p,p DDT T o,p DDT 0.18 DDE 4.9 Arsenic
7/15	639	T Lindane 0.31 p,p DDT 0.11 o,p DDT 0.15 DDE T Dieldrin 5.2 Arsenic
8/20	1599	T Lindane 1.6 p,p DDT T o,p DDT 0.63 DDE
8/20	1600	N
9/14	2266	1.0 p,p DDT 0.2 o,p DDT T DDE 0.1 Dieldrin
9/14	2270	T Lindane 0.46 p,p DDT T o,p DDT 0.27 DDE

BIOLOGICAL RECORDS

SWEEP NET

BLOCK 7-MILO

		Totals Per 100 Sweeps-One Collection Per Week							
Indicator	: June	June	July	July	July	July	July	July	Aug.
Species	: 20	25	2	6	13	23	30	5	
Grasshoppers	: 0	1	3	0	1	0	0	0	0
Lady beetles	: 0	2	9	10	3	11	0	0	0
Bumble bees	: 0	0	0	0	0	0	0	0	0

	: Aug.	Aug.	Aug.	Sept.	Sept.	Sept.	Sept.	Oct.	
	: 13	20	25	2	7	15*		5	
Grasshoppers	: 0	0	0	0	0	0	0	0	0
Lady beetles	: 0	0	0	0	0	0	0	0	0
Bumble bees	: 0	0	0	0	0	0	0	0	0
	: :								

*This block disced up

GRA

CHEMICAL TREATMENT HISTORY
Pounds Of Technical Material Per Acre

GRA - Block 8 (10 Acres of corn)			
Date applied	Endrin	Methyl Parathion	Remarks
1959-1963			None applied.
1964 6/17	0.2	0.25	

GRA - Soil Samples

GRA - Block 8

<u>Date sampled</u> <u>1964</u>	<u>Log</u> <u>number</u>	<u>Pesticides found</u> <u>ppm</u>
6/3	G4-93	0.2 p,p DDT 0.13 DDE 3.4 Arsenic
6/3	94	0.18 p,p DDT T DDE 2.4 Arsenic
6/23	290	3.7 Arsenic
6/23	291	0.33 p,p DDT 0.15 DDE 2.8 Arsenic
7/15	640	T p,p DDT T o,p DDT 0.2 DDE T Dieldrin 0.12 Endrin 2.3 Arsenic
7/15	641	0.21 p,p DDT 0.18 o,p DDT 0.51 DDE 0.1 Dieldrin 3.7 Arsenic
8/10	1384	0.61 p,p DDT 0.32 o,p DDT 0.25 DDE 0.26 Dieldrin 0.12 Endrin 4.0 Arsenic
8/10	1385	4.6 Arsenic Analysis incomplete
9/8	2085	0.32 p,p DDT 0.16 o,p DDT 0.14 DDE 0.1 Dieldrin

Summary of Results

GROUP	AGE	SEX	DATE
1. 1st Group	1st	1st	1st
2. 2nd Group	2nd	2nd	2nd
3. 3rd Group	3rd	3rd	3rd
4. 4th Group	4th	4th	4th
5. 5th Group	5th	5th	5th
6. 6th Group	6th	6th	6th
7. 7th Group	7th	7th	7th
8. 8th Group	8th	8th	8th
9. 9th Group	9th	9th	9th
10. 10th Group	10th	10th	10th
11. 11th Group	11th	11th	11th
12. 12th Group	12th	12th	12th
13. 13th Group	13th	13th	13th
14. 14th Group	14th	14th	14th
15. 15th Group	15th	15th	15th
16. 16th Group	16th	16th	16th
17. 17th Group	17th	17th	17th
18. 18th Group	18th	18th	18th
19. 19th Group	19th	19th	19th
20. 20th Group	20th	20th	20th

BIOLOGICAL RECORD

SWEEP NET

BLOCK 8-CORN (PECANS)

		Totals Per 100 Sweeps-One Collection Per Week									
Indicator :	June	June	July	July	July	July	July	Sept.	Sept.	July	Aug.
Species :	18	25	2	6	13	21	30	15	22*	30	5
Grasshoppers :	0	0	0	0	0	0	0	0	0	0	0
Lady beetles :	0	0	4	5	0	3	0	0	0	0	0
Bumble bees :	0	0	0	0	0	0	0	0	0	0	0

Grasshoppers :	Aug. 13	Aug. 20	Aug. 25	Sept. 2	Sept. 7	Sept. 15	Sept. 22*	Sept. 15	Sept. 22*	Sept. 30	Sept. 5
Lady beetles :	0	0	0	0	0	0	0	0	0	0	0
Bumble bees :	0	0	0	0	0	0	0	0	0	0	0

*This block disced up; only stubbles left.

GRA

BIOLOGICAL RECORD

PITFALL TRAPS

BLOCK 8-CORN AND PECANS

Indicator Species	Total Number Per Composite (3 Traps)						Sample-Collected Bi-Weekly					
	June 18*		July 14		Aug. 11		Aug. 25		Sept. 9		Sept. 16	
	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
Ants	0	0	0	0	0	0	1	0	3	2	2	5
Spiders	1	0	4	0	0	0	0	0	0	0	0	0
Ground beetles	0	0	0	0	2	1	0	0	0	3	0	1
Earwigs	0	0	0	0	0	0	0	0	0	0	0	0
Rove beetles	0	0	0	0	0	0	0	1	0	0	0	0
Field crickets	0	0	0	0	2	4	0	0	1	1	0	0

*Only one sample taken.

S1=Sample One
S2=Sample Two

GRA

BIOLOGICAL RECORD

SOIL SAMPLES

BLOCK 8-CORN AND PECANS

		Totals Per Sample-Five 5-Inch Cores (One Foot Deep) Collected Monthly							
Indicator Species		June 29		July 15		Aug. 13		Sept. 11	
		S1	S2	S1	S2	S1	S2	S1	S2
White Grubs	:	0	1	0	0	0	0	0	0
Wireworms	:	0	0	0	0	0	0	0	0
Earthworms	:	0	2	0	0	0	0	0	0
	:								

S1=Sample One
S2=Sample Two

GRA

THE NEW YORK PUBLIC LIBRARY

ASTOR LENOX TILDEN FOUNDATION

1007 10th Ave. New York, N.Y.

THE NEW YORK PUBLIC LIBRARY
ASTOR LENOX TILDEN FOUNDATION
1007 10th Ave. New York, N.Y.

NEW YORK

LIBRARY

NEW YORK

NEW YORK

NEW YORK

CHEMICAL TREATMENT HISTORY
Pounds Of Technical Material Per Acre

GRA - Block 9 (30 Acres of pasture and fallow)

Date applied	Dioxathion	Remarks
1959-1963		None applied.
1964 7/23	0.5/50 gals. water	Sprayed on 20 head of cattle confined in barn lot. Approximately 2½ gallons of solution per animal.
9/8	0.5/50 gals. water	Sprayed on 20 head of cattle confined in barn lot. Approximately 2½ gallons of solution per animal.

THEORY OF THE EARTH

CHAPTER I

OF THE EARTH

THE EARTH IS A SPHERE, AND ITS SURFACE IS COVERED BY A THIN LAYER OF WATER, WHICH IS CALLED THE OCEAN.

THE EARTH IS DIVIDED INTO TWO PARTS, THE NORTH AND SOUTH POLES, BY A LINE CALLED THE EQUATOR.

GRA - Soil Samples

GRA - Block 9

<u>Date sampled</u> <u>1964</u>	<u>Log</u> <u>number</u>	<u>Pesticides found</u> <u>ppm</u>
6/3	G4-95	1.3 Arsenic
6/3	96	2.1 Arsenic
6/23	292	1.0 Arsenic
6/23	293	2.0 Arsenic
7/23	854	0.7 Arsenic
7/23	855	2.0 Arsenic
8/19	1601	N
8/19	1602	N
9/14	2267	N
9/14	2268	N

6-B
7-A

Table 1.2.1.1

Sample description log	Total amount	Concentration - Significant ADL
Element 1.1	1.000	1.00
Element 1.2	0.9	0.90
Element 1.3	0.8	0.80
Element 1.4	0.7	0.70
Element 1.5	0.6	0.60
Element 1.6	0.5	0.50
Element 1.7	0.4	0.40
Element 1.8	0.3	0.30
Element 1.9	0.2	0.20
Element 1.10	0.1	0.10

BIOLOGICAL RECORD

SWEEP NET

BLOCK 9-PASTURE (FALLOW)

		Totals Per 100 Sweeps-One Collection Per Week							
Indicator	:	June 20	June 25	July 2	July 6	July 13	July 21	July 30	Aug. 5
Species	:								
Grasshoppers	:	1	2	1	1	0	0	0	0
Lady beetles	:	0	0	0	0	0	0	0	0
Bumble bees	:	0	0	0	0	0	0	0	0

	:	Aug. 13	Aug. 20	Aug. 25	Sept. 2	Sept. 7	Sept. 15*	Sept. 22	Oct. 5
Grasshoppers	:	0	2	2	1	1	0	0	1
Lady beetles	:	0	0	0	0	0	0	0	0
Bumble bees	:	0	0	0	0	0	0	0	0

*Block disced up

GRA

End of the world

CHEMICAL TREATMENT HISTORY
Pounds Of Technical Material Per Acre

GRA - Block 10 (175 Acres of cotton)									
Date applied	Anhydrous Ammonia	Calcium Cyanamide	DDT	Diuron	Endrin	Methyl Parathion	Toxaphene	Mexphos	Remarks
1960									
					0.14	0.08			1 Application.
					0.2	0.16			2 Applications.
						0.25			7 Applications.
1961									
					0.14	0.08			2 Applications
					0.2	0.16			1 Application
						0.25			11 Applications.
1962					0.07	0.08			1 Application.
					0.14	0.16			3 Applications.
					0.2	0.25			8 Applications.
1963							1.0		1 Application.
					0.14	0.16			2 Applications.
					0.2	0.25			10 Applications.
					0.3				1 Application
					0.3	0.4			2 Applications
					0.4	0.5			1 Application
1964									
5/18	100.0					0.166	1.0		
5/25						0.166	1.0		
6/9			0.6			0.8			
6/20			0.6			0.8			
7/16				0.8					
7/17					0.2	0.25			150 A. treated.
8/13					0.32	0.32			150 A. treated.
8/19					0.32	0.32			150 A. treated.
8/26					0.32	0.32			
8/27					0.32	0.32			
9/3					0.32	0.32			
9/9					0.32	0.32			
9/19					0.32	0.32			
10/8					0.32	0.32			
		17.0							
								1.0	

GRA - Soil Samples

GRA - Block 10

Date sampled 1964	Log number	Pesticides found ppm
6/4	G4-97	1.99 p,p DDT 0.37 o,p DDT 0.25 DDE 5.5 Arsenic
6/4	98	1.18 p,p DDT 0.26 o,p DDT 0.16 DDE 3.8 Arsenic
6/24	294	1.24 p,p DDT 0.48 o,p DDT 0.29 DDE 5.1 Arsenic
6/24	295	2.1 p,p DDT 0.45 o,p DDT 0.25 DDE 4.4 Arsenic
8/3	1086	1.16 p,p DDT 0.61 o,p DDT 0.31 DDE 4.4 Arsenic
8/3	1087	5.8 Arsenic Analysis incomplete
8/24	1749	T Lindane 1.21 p,p DDT 0.35 DDE T Dieldrin T Endrin
8/24	1750	0.65 p,p DDT 0.45 o,p DDT 0.18 DDE 4.04 Methyl Parathion 2.
9/24	2457	T Lindane 0.8 p,p DDT T Dieldrin
9/24	2458	0.4 p,p DDT

BIOLOGICAL RECORD

SWEEP NET

BLOCK 10-COTTON

Totals Per 100 Sweeps-One Collection Per Week									
Indicator :	June 18	June 25	July 2	July 6	July 16*	July 21*	July 30	Aug. 5	
Species :									
Grasshoppers :	0	0	0	0			0	0	
Lady beetles :	0	0	0	0			0	0	
Bumble bees :	0	0	0	1			0	0	

Grasshoppers :	Aug. 13	Aug. 21	Aug. 25	Aug. 31	Sept. 7	Sept. 15	Sept. 22	Oct. 5	
Lady beetles :	0	0	0	0	0	0	0	0	
Bumble bees :	0	0	0	0	0	0	0	0	

*No samples taken during week

GRA

BIOLOGICAL RECORD

PITFALL TRAPS

BLOCK 10-COTTON

Indicator Species	Total Number Per Composite (3 Traps)										Sample-Collected Bi-Weekly			
	June 18*		July 24**		Aug. 4		Aug. 22		Sept. 1		Sept. 14		Sept. 27	
	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
Ants	0				0	0	0	0	2	0	0	0	0	0
Spiders	0				0	0	0	0	0	0	0	1	0	0
Ground beetles	2				1	2	1	1	0	4	0	0	0	0
Earwigs	0				0	0	0	0	0	0	0	0	0	0
Rove beetles	0				0	0	0	0	0	0	0	0	0	0
Field crickets	0				0	1	0	0	0	0	1	0	1	0

*Only one sample taken.

**No sample taken because of layby herbicide at request of owner.

S1=Sample One
S2=Sample Two

GRA

THE UNIVERSITY OF CHICAGO

1911-12

BIOLOGICAL RECORD

SOIL SAMPLES

BLOCK 10-COTTON

		Totals Per Sample-Five 5-Inch Cores (One Foot Deep) Collected Monthly					
Indicator Species		July 7		Aug. 24		Sept. 19	
		S1	S2	S1	S2	S1	S2
White Grubs	:	0	0	0	0	0	0
Wireworms	:	0	0	0	0	0	0
Earthworms	:	0	0	0	0	0	0
	:						

S1=Sample One
S2=Sample Two

GRA

CHEMICAL TREATMENT HISTORY
Pounds Of Technical Material Per Acre

GRA - Block 11 (20 Acres of soybeans)			Remarks
Date applied	Carbaryl		
1960-1963			None applied.
1964			
9/18	1.5		

GRA - Soil Samples

GRA - Block 11

<u>Date sampled</u> <u>1964</u>	<u>log</u> <u>number</u>	<u>Pesticides found</u> <u>ppm</u>
6/4	G4-99	3.8 Arsenic
6/4	100	4.1 Arsenic
6/29	363	4.6 Arsenic
6/29	364	4.6 Arsenic
7/29	976	0.68 p,p DDT 5.3 Arsenic
7/29	977	0.16 p,p DDT 4.9 Arsenic
8/31	1923	0.3 p,p DDT T Endrin
8/31	1924	0.5 p,p DDT 0.35 o,p DDT 0.11 DDE
10/8	2620	0.26 p,p DDT 0.18 o,p DDT T DDE T Endrin
10/8	2624	N

6-B

7-A

1880

1880

1880

1880

1880

1880

1880

1880

BIOLOGICAL RECORD

SWEEP NET

BLOCK 11-SOYBEANS

Totals Per 100 Sweeps-One Collection Per Week									
Indicator	June 25	July 2	July 9	July 13	July 21	July 30	Aug. 5	Aug. 13	
Species									
Grasshoppers	1	1	0	0	0	2	1	0	
Lady beetles	0	0	0	0	0	0	0	3	
Bumble bees	0	0	0	0	0	0	0	0	

	Aug. 20	Aug. 25	Sept. 2	Sept. 7	Sept. 15	Sept. 22	Oct. 5		
Grasshoppers	0	0	0	0	0	0	0	0	
Lady beetles	2	0	0	0	0	0	0	0	
Bumble bees	0	0	0	0	0	0	0	0	

GRA

Handwritten text, possibly a signature or date, located in the upper right corner of the page.

CHEMICAL TREATMENT HISTORY
Pounds Of Technical Material Per Acre

GRA - Block 12 (7 Acres of soybeans)			
Date applied	Carbaryl	Endrin	Methyl Parathion
1960			
		0.14	0.08
		0.2	0.16
			0.25
1961			
		0.14	0.08
		0.2	0.16
			0.25
1962-1963			
			1 Application.
			2 Applications.
			7 Applications.
			2 Applications.
			1 Application.
			11 Applications.
			None applied.
1964			
9/19	1.5		

STRAIGHT LINE METHOD OF INTERPOLATION

STATION	INTERPOLATED	REMARKS
1000	1000	1000
1001	1001	1001
1002	1002	1002
1003	1003	1003
1004	1004	1004
1005	1005	1005
1006	1006	1006
1007	1007	1007
1008	1008	1008
1009	1009	1009
1010	1010	1010
1011	1011	1011
1012	1012	1012
1013	1013	1013
1014	1014	1014
1015	1015	1015
1016	1016	1016
1017	1017	1017
1018	1018	1018
1019	1019	1019
1020	1020	1020
1021	1021	1021
1022	1022	1022
1023	1023	1023
1024	1024	1024
1025	1025	1025
1026	1026	1026
1027	1027	1027
1028	1028	1028
1029	1029	1029
1030	1030	1030
1031	1031	1031
1032	1032	1032
1033	1033	1033
1034	1034	1034
1035	1035	1035
1036	1036	1036
1037	1037	1037
1038	1038	1038
1039	1039	1039
1040	1040	1040
1041	1041	1041
1042	1042	1042
1043	1043	1043
1044	1044	1044
1045	1045	1045
1046	1046	1046
1047	1047	1047
1048	1048	1048
1049	1049	1049
1050	1050	1050
1051	1051	1051
1052	1052	1052
1053	1053	1053
1054	1054	1054
1055	1055	1055
1056	1056	1056
1057	1057	1057
1058	1058	1058
1059	1059	1059
1060	1060	1060
1061	1061	1061
1062	1062	1062
1063	1063	1063
1064	1064	1064
1065	1065	1065
1066	1066	1066
1067	1067	1067
1068	1068	1068
1069	1069	1069
1070	1070	1070
1071	1071	1071
1072	1072	1072
1073	1073	1073
1074	1074	1074
1075	1075	1075
1076	1076	1076
1077	1077	1077
1078	1078	1078
1079	1079	1079
1080	1080	1080
1081	1081	1081
1082	1082	1082
1083	1083	1083
1084	1084	1084
1085	1085	1085
1086	1086	1086
1087	1087	1087
1088	1088	1088
1089	1089	1089
1090	1090	1090
1091	1091	1091
1092	1092	1092
1093	1093	1093
1094	1094	1094
1095	1095	1095
1096	1096	1096
1097	1097	1097
1098	1098	1098
1099	1099	1099
1100	1100	1100

GRA - Soil Samples

GRA - Block 12

Date sampled 1964	Log number	Pesticides found ppm
6/3	G4-101	1.6 p,p DDT 0.38 o,p DDT 0.17 DDE 6.3 Arsenic
6/3	102	1.7 p,p DDT 0.3 o,p DDT 0.21 DDE 6.1 Arsenic
6/27	359	1.63 p,p DDT 0.22 DDE 6.4 Arsenic
6/27	360	1.56 p,p DDT 0.17 DDE 6.9 Arsenic
7/23	856	T Lindane 0.92 p,p DDT 0.4 o,p DDT 0.28 DDE 0.19 Dieldrin 0.29 Endrin 8.6 Arsenic
7/23	857	0.66 p,p DDT 0.4 o,p DDT 0.2 DDE 3.6 Arsenic
8/13	1386	0.62 p,p DDT 0.23 o,p DDT 0.21 DDE T Dieldrin 12.5 Arsenic
8/13	1387	0.43 p,p DDT 0.37 o,p DDT 0.16 DDE 4.9 Arsenic
9/8	2074	0.11 Dieldrin
9/8	2078	0.6 p,p DDT T Dieldrin

BIOLOGICAL RECORD

SWEEP NET

BLOCK 12-SOYBEANS

Totals Per 100 Sweeps-One Collection Per Week									
Indicator :	June 20	June 25	July 2	July 6	July 13	July 21	July 30	Aug. 5	
Species :									
Grasshoppers :	0	0	2	1	0	1	0	0	0
Lady beetles :	0	0	0	0	0	0	0	0	0
Bumble bees :	0	0	0	0	0	0	0	0	0

Aug. 13	13	20	25	2	7	15	22	5	
Grasshoppers :	0	1	0	1	0	0	0	0	0
Lady beetles :	0	0	0	0	0	0	0	0	0
Bumble bees :	0	0	0	0	0	0	0	0	0
:									

GRA

1. The first part of the paper is devoted to a discussion of the general principles of the theory of the structure of the atom.

2. The second part of the paper is devoted to a discussion of the general principles of the theory of the structure of the atom.

3. The third part of the paper is devoted to a discussion of the general principles of the theory of the structure of the atom.

4. The fourth part of the paper is devoted to a discussion of the general principles of the theory of the structure of the atom.

CHEMICAL TREATMENT HISTORY
Pounds Of Technical Material Per Acre

GRA - Block 13 (147 Acres of cotton)

Date applied	DDT	Endrin	Methyl Parathion	Toxaphene	Remarks
1959				0.5	2 Applications.
				1.0	2 Applications.
				2.0	3 Applications.
	1.0			2.5	2 Applications.
	1.0				6 Applications.
1960			0.08		1 Application.
		0.14	0.16		2 Applications.
		0.2	0.25		7 Applications
1961			0.08		2 Applications.
		0.14	0.16		1 Application.
		0.2	0.25		11 Applications.
1962			0.08		1 Application.
		0.14	0.16		3 Applications.
		0.2	0.25		8 Applications.
1963			0.08	1.0	1 Application.
		0.14	0.16		2 Applications.
		0.2	0.25		10 Applications.
		0.3			1 Application.
		0.3	0.4		2 Applications.
		0.4	0.5		1 Application.

See next page for treatments applied in 1964.

1. 1. 1.
2. 2. 2.
3. 3. 3.

1. 1. 1.
2. 2. 2.
3. 3. 3.

CHEMICAL TREATMENT HISTORY
Pounds Of Technical Material Per Acre

GRA - Block 13 (147 Acres of cotton)									
Date applied	Anhydrous Ammonia	Carbo-phenothon	DDT	Diuron	Endrin	Merphos	Methyl Parathion	Toxaphene	Remarks
5/18	100.0						0.166	1.0	
5/25							0.166	1.0	
6/8			0.6				0.8		
6/17			0.6				0.8		
7/17				0.8					
7/21					0.2		0.25		
7/25		0.5			0.2		0.25		8 A. treated for red spider.
8/6					0.32		0.32		
8/19					0.32		0.32		
8/20		0.5							8 A. treated for red spider.
8/27					0.32		0.32		
9/3					0.32		0.32		
9/9					0.32		0.32		
9/10						0.66			Applied to 65 A.
9/19						0.75			Applied to 65 A.
9/19						1.0			Applied to 82 A.

GRA - Soil Samples

GRA - Block 13

Date sampled 1964	Log number	Pesticides found ppm
6/4	G4-103	2.6 p,p DDT 0.43 o,p DDT 0.25 DDE 3.7 Arsenic
6/4	104	1.9 p,p DDT 0.33 o,p DDT 0.33 DDE 3.8 Arsenic
6/24	296	0.69 Lindane 1.59 p,p DDT 0.2 o,p DDT 0.26 DDE 3.2 Arsenic
6/24	297	2.81 p,p DDT 0.95 o,p DDT 0.37 DDE T Dieldrin T Endrin 4.8 Arsenic
8/3	1088	0.93 p,p DDT 0.65 o,p DDT 0.26 DDE T Dieldrin 0.23 Endrin 4.9 Arsenic
8/3	1089	1.01 p,p DDT 0.35 o,p DDT 0.35 DDE T Dieldrin 0.29 Endrin 4.2 Arsenic
8/24	1751	3.36 p,p DDT T o,p DDT 0.93 DDE
9/21	2452	0.6 p,p DDT T Dieldrin
9/21	2455	0.7 p,p DDT 0.12 Dieldrin 0.27 Endrin

6-B
7-A

1. The first part of the paper
describes the general principles
of the method.

BIOLOGICAL RECORD

SWEEP NET

BLOCK 13-COTTON

		Totals Per 100 Sweeps-One Collection Per Week							
Indicator	: June	June	July	July	July	July	July	July	Aug.
Species	: 18	25	2	6	16*	21*	30	30	5
Grasshoppers	: 0	0	1	0			0	0	0
Lady beetles	: 0	1	0	0			0	0	0
Bumble bees	: 0	0	0	0			0	0	0

	: Aug.	Aug.	Aug.	Aug.	Sept.	Sept.	Sept.	Sept.	Oct.
	: 13	21	25	31	7	15	22	22	5
Grasshoppers	: 0	0	0	0	0	0	0	0	0
Lady beetles	: 0	0	0	0	0	0	0	0	0
Bumble bees	: 0	0	0	0	0	0	0	0	0

*No samples taken

GRA

CHEMICAL TREATMENT HISTORY
Pounds Of Technical Material Per Acre

GRA - Block 14 (35 Acres of soybeans)						
Date applied	BHC	Carbaryl	DDT	Endrin	Methyl Parathion	Toxaphene
1959						
						0.5
						1.0
			1.0			2.0
	0.3		1.0			2.5
1960						
					0.08	
				0.14	0.16	
				0.2	0.25	
1962						
				0.07	0.08	
				0.14	0.16	
				0.2	0.25	
1964						
9/19		1.5				

2 Applications.
2 Applications.
3 Applications.
2 Applications.
6 Applications.

1 Application.
2 Applications.
7 Applications.

1 Application.
3 Applications.
8 Applications.



RECEIVED
JAN 10 1934

RECEIVED

2.0

2.5

GRA - Soil Samples

GRA - Block 14

Date sampled 1964	Log number	Pesticides found ppm
6/3	G4-105	0.33 p,p DDT T DDE 4.4 Arsenic
6/3	106	0.69 p,p DDT 0.27 o,p DDT 0.32 DDE 4.0 Arsenic
6/23	298	0.41 p,p DDT 0.17 DDE 4.7 Arsenic
6/23	299	3.6 Arsenic Analysis incomplete
7/29	978	0.64 p,p DDT 0.25 o,p DDT 0.31 DDE 5.0 Arsenic
7/29	979	1.7 p,p DDT 1.0 o,p DDT 0.59 DDE 5.1 Arsenic
8/31	1920	1.7 p,p DDT 0.4 o,p DDT T DDE
8/31	1925	0.9 p,p DDT 0.1 DDE T Dieldrin T Endrin

6-B

7-A

Handwritten notes at the top left of the page, possibly a title or introductory text.

Handwritten notes at the top right of the page, possibly a date or reference.

Handwritten notes in the middle left section of the page.

Handwritten notes in the middle right section of the page.

Handwritten notes at the bottom center of the page.

BIOLOGICAL RECORD

SWEEP NET

BLOCK 14-SOYBEANS

		Totals Per 100 Sweeps-One Collection Per Week						
Indicator	: June	July	July	July	Sept.	Sept.	Sept.	Oct.
Species	: 25	2	9	21	30	5	13	
Grasshoppers	: 0	0	0	0	0	0	0	0
Lady beetles	: 0	0	0	0	0	0	0	0
Bumble bees	: 0	0	0	0	0	0	0	0

	: Aug.	Aug.	Sept.	Sept.	Sept.	Sept.	Oct.	
	: 20	25	2	7	15	22	5	
Grasshoppers	: 0	0	0	0	0	0	0	0
Lady beetles	: 0	0	2	0	0	0	0	0
Bumble bees	: 0	0	0	0	0	0	0	0
	: :							

GRA

UNION PAC

BIOLOGICAL RECORD

PITFALL TRAPS

BLOCK 14--SOYBEANS

Indicator Species	Total Number Per Composite (3 Traps) Sample-Collected Bi-Weekly									
	June 19*		July 14		July 24		Aug. 11		Aug. 25	
	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
Ants	0	0	0	0	0	0	0	0	1	0
Spiders	0	0	0	0	0	0	0	0	0	0
Ground beetles	0	0	1	0	4	1	2	6	0	1
Earwigs	0	0	0	0	0	0	0	0	0	0
Rove beetles	0	0	0	0	0	0	0	0	0	0
Field crickets	0	0	0	0	0	0	1	3	0	0

*Only one sample taken.

S1=Sample One
S2=Sample Two

GRA

BIOLOGICAL RECORD

SOIL SAMPLES

BLOCK 14-SOYBEANS

Totals Per Sample-Five 5-Inch Cores (One Foot Deep) Collected Monthly									
Indicator Species	July 8		July 16		Aug. 13		Sept. 11		
	S1	S2	S1	S2	S1	S2	S1	S2	
White Grubs	0	0	0	0	0	0	0	0	
Wireworms	0	0	0	0	0	0	0	0	
Earthworms	0	0	0	0	0	0	0	0	

S1=Sample One
S2=Sample Two

GRA

GRA - Water And Silt Samples^{1/}

- A - Well water
- B - Water leaving the study area
- C - Water running off the fields
- D - Water draining onto the area from outside
- E - Water flowing off fields immediately after rain

Material sampled	Location	Date 1964	Log number	Pesticides found	
				ppb	ppm
C Water	1	6/9	G4-221	N	
C Silt	1	6/9	248		N
C Water	2	6/9	222	N	
C Silt	2	6/9	249		N
A Water	3-6	6/9	223	N	
C Water	9	6/9	224	0.39	Lindane
C Silt	9	6/9	250		0.36 p,p DDT 0.3 o,p DDT
C Water	4	6/9	225	N	
C Water	5	6/9	226	N	
C Silt	5	6/9	251		0.25 Lindane 0.14 p,p DDT 0.79 o,p DDT 0.39 DDE 0.13 Heptachlor
C Water	1	7/1	347	N	
C Silt	1	7/1	440		N
C Water	2	7/1	348	N	
C Silt	2	7/1	441		N
C Water	5	7/1	349	N	
C Silt	5	7/1	442		0.25 o,p DDT 0.36 DDE
C Water	4	7/1	350	N	
B Silt	10	7/11	567		N
B Water	10	7/11	582	N	
A Water	3,6,7	7/11	583	N	
C Water	1	7/17	845	N	
C Silt	1	7/17	920		N
C Water	2	7/17	846	N	
C Silt	2	7/17	921		N

^{1/} Classifications B, C, D, and E also apply to silt.

GRA - Water And Silt Samples (Cont'd.)

Material sampled	Location	Date 1964	Log number	Pesticides found	
				ppb	ppm
C Water	4	7/23	G4-847	N	
C Water	8	7/23	848	N	
C Silt	8	7/23	922		0.08 Lindane 0.32 o,p DDT 0.1 DDE 0.06 Heptachlor
C Silt	8	7/23	923		0.09 p,p DDT 0.51 o,p DDT 0.31 DDE
A Water	3,6,7	7/27	958	N	
C Water	9	7/28	959	N	
C Silt	9	7/28	1040		T p,p DDT 0.3 o,p DDT 0.15 DDE
C Silt	5	8/10	1355		0.25 o,p DDT 0.15 DDE T Endrin
C Water	5	8/10	1480	N	
B Silt	10	8/8	1356		T Dieldrin
B Water	10	8/8	1481	N	
C Water	4	8/11	1479	N	
C Water	1	8/14	1520	N	
C Silt	1	8/14	1529		N
C Silt	5	8/17	1543		0.61 o,p DDT 0.2 DDE T Dieldrin
C Silt	9	8/17	1544		T Lindane 0.32 p,p DDT 0.93 o,p DDT 0.29 DDE 0.16 Dieldrin 0.11 Endrin
E Silt - Runoff from blocks 13-14		8/17	1545		0.23 p,p DDT 0.36 DDE 0.2 Dieldrin

GRA - Water And Silt Samples (Cont'd.)

Material sampled	Location	Date 1964	Log number	Pesticides found	
				ppb	ppm
C Water	1	8/19	G4-1627	N	
E Water Blks. 2,3,4,7		8/17	1628	N	
A Water	3,6,7	8/17	1629	N	
C Silt	2	8/26	1800		N
B Silt	10	8/26	1801		0.18 o,p DDT T DDE
C Silt	1	9/10	2115		N
C Water	1	9/10	2157	N	
C Silt	8	9/4	2127		T p,p DDT 0.43 o,p DDT 0.12 DDE
C Water	4	9/10	2151	N	
C Silt	5	9/10	2124		0.36 o,p DDT 0.11 DDE
C Water	5	9/10	2156	N	
C Silt	9	9/16	2237		T p,p DDT 0.45 o,p DDT 0.17 DDE 0.32 Endrin
A Water	3,6,7	9/18	2396	N	
C Water	2	9/23	2398	N	
C Silt	2	9/23	2429		N
C Silt	8	10/3	2642		N
B Silt	10	9/23	2427		0.05 Lindane 0.15 p,p DDT 0.38 o,p DDT 0.24 DDE T Dieldrin 0.23 Endrin

GRA - Apiary Samples

Material sampled	Date 1964	Log number	Pesticides found ppm
Bees	7/10	G4-728	T p,p DDE 0.18 o,p DDE
Bees	7/15	729	1.52 p,p DDT 0.38 o,p DDT 0.26 p,p DDE 0.26 o,p DDE 0.15 Dieldrin 0.18 Endrin
Bees	7/3	775	0.39 p,p DDT 0.23 o,p DDT 0.2 p,p DDE 0.19 o,p DDE 0.27 Dieldrin T Heptachlor
Nectar - Hive 6	7/3	781	N
Pollen - Hive 6 Vial 1	7/4	806	N
Corn Pollen - Hive 6 Vial 1	7/12	809	N
Honey - Hive 6	8/3	1158	N
Honey - Hive 6	8/3	1168	N
Honey - Hive 62	8/3	1169	N
Honey - Hive 62	8/3	1171	N
Nectar - Hive 6	8/4	1186	N
Nectar - Hive 6	8/4	1187	N
Nectar	7/21	1188	N
Nectar	7/21	1189	N
Pollen - Vial 1	8/4	1216	N

REFUGEE VOLVED - 11

GRA - Apiary Samples (Cont'd.)

Material sampled	Date 1964	Log number	Pesticides found ppm
Bees	7/22	G4-1223	0.23 Aldrin 0.1 Lindane 0.39 p,p DDT 0.23 o,p DDT 0.33 p,p DDE 0.16 Dieldrin 0.18 Heptachlor
Bees	7/27-31	1224	0.33 p,p DDT 0.15 o,p DDT 0.15 p,p DDE 0.22 o,p DDE
Bees	7/20-24	1227	0.15 Lindane 0.19 p,p DDT 0.14 o,p DDT 0.16 p,p DDE 0.28 o,p DDE 0.11 Heptachlor
Pollen - Vial 1	7/21	1333	N
Bees	8/12	1456	T p,p DDE 0.18 o,p DDE T Dieldrin
Pollen - Vial 1	8/18	1682	N
Bees	8/13	1687	0.11 Aldrin 0.16 Lindane 0.32 p,p DDT 0.53 o,p DDT 0.11 p,p DDE 0.23 o,p DDE 0.17 Dieldrin T Heptachlor 0.13 Heptachlor Epox.
Bees	8/20	1689	T Aldrin 0.12 Lindane 0.22 Endrin T Heptachlor
Bees	8/17,18,21	1850	0.18 Lindane 0.13 p,p DDT 0.71 o,p DDT 0.1 p,p DDE 0.18 o,p DDE T Heptachlor

Table of Contents

Page	Chapter	Section	Page
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
10	10	10	10
11	11	11	11
12	12	12	12
13	13	13	13
14	14	14	14
15	15	15	15
16	16	16	16
17	17	17	17
18	18	18	18
19	19	19	19
20	20	20	20
21	21	21	21
22	22	22	22
23	23	23	23
24	24	24	24
25	25	25	25
26	26	26	26
27	27	27	27
28	28	28	28
29	29	29	29
30	30	30	30
31	31	31	31
32	32	32	32
33	33	33	33
34	34	34	34
35	35	35	35
36	36	36	36
37	37	37	37
38	38	38	38
39	39	39	39
40	40	40	40
41	41	41	41
42	42	42	42
43	43	43	43
44	44	44	44
45	45	45	45
46	46	46	46
47	47	47	47
48	48	48	48
49	49	49	49
50	50	50	50
51	51	51	51
52	52	52	52
53	53	53	53
54	54	54	54
55	55	55	55
56	56	56	56
57	57	57	57
58	58	58	58
59	59	59	59
60	60	60	60
61	61	61	61
62	62	62	62
63	63	63	63
64	64	64	64
65	65	65	65
66	66	66	66
67	67	67	67
68	68	68	68
69	69	69	69
70	70	70	70
71	71	71	71
72	72	72	72
73	73	73	73
74	74	74	74
75	75	75	75
76	76	76	76
77	77	77	77
78	78	78	78
79	79	79	79
80	80	80	80
81	81	81	81
82	82	82	82
83	83	83	83
84	84	84	84
85	85	85	85
86	86	86	86
87	87	87	87
88	88	88	88
89	89	89	89
90	90	90	90
91	91	91	91
92	92	92	92
93	93	93	93
94	94	94	94
95	95	95	95
96	96	96	96
97	97	97	97
98	98	98	98
99	99	99	99
100	100	100	100

GRA - Apiary Samples (Cont'd.)

Material sampled	Date 1964	Log number	Pesticides found ppm
Bees	8/28	G4-2039	T Lindane 0.12 p,p DDT T p,p DDE 0.19 o,p DDE 0.28 Dieldrin T Heptachlor
Bees	9/1	2040	0.1 Aldrin 0.14 Lindane 0.16 p,p DDT 0.13 p,p DDE 0.11 o,p DDE 0.16 Heptachlor
Nectar	8/31	2042	N
Bees	9/3	2045	T Lindane 0.24 p,p DDT 0.18 o,p DDT 0.2 p,p DDE 0.11 o,p DDE T Endrin
Bees	9/17	2221	1.52 o,p DDT T p,p DDE 0.92 o,p DDE T Dieldrin
Bees	9/5	2224	0.11 p,p DDT T o,p DDT 0.1 p,p DDE 0.29 o,p DDE 0.15 Dieldrin 1.58 Endrin
Bees	9/9	2225	T p,p DDT T o,p DDT 0.18 p,p DDE 0.31 o,p DDE 0.17 Dieldrin 0.12 Heptachlor
Bees	9/10	2226	0.18 Lindane 0.34 p,p DDT 0.41 o,p DDT 0.15 p,p DDE 0.88 o,p DDE 0.31 Dieldrin 0.95 Endrin 0.23 Heptachlor

Account	Debit	Credit	Balance
1000			
1001			
1002			
1003			
1004			
1005			
1006			
1007			
1008			
1009			
1010			
1011			
1012			
1013			
1014			
1015			
1016			
1017			
1018			
1019			
1020			
1021			
1022			
1023			
1024			
1025			
1026			
1027			
1028			
1029			
1030			
1031			
1032			
1033			
1034			
1035			
1036			
1037			
1038			
1039			
1040			
1041			
1042			
1043			
1044			
1045			
1046			
1047			
1048			
1049			
1050			
1051			
1052			
1053			
1054			
1055			
1056			
1057			
1058			
1059			
1060			
1061			
1062			
1063			
1064			
1065			
1066			
1067			
1068			
1069			
1070			
1071			
1072			
1073			
1074			
1075			
1076			
1077			
1078			
1079			
1080			
1081			
1082			
1083			
1084			
1085			
1086			
1087			
1088			
1089			
1090			
1091			
1092			
1093			
1094			
1095			
1096			
1097			
1098			
1099			
1100			

GRA - Apiary Samples (Cont'd.)

Material sampled	Date 1964	Log number	Pesticides found ppm
Bees	9/4	G4-2227	0.29 p,p DDT 0.17 o,p DDT T p,p DDE 0.4 o,p DDE T Dieldrin 0.17 Heptachlor 0.31 Parathion
Bees	9/11	2324	0.18 p,p DDT 0.11 p,p DDE 0.4 o,p DDE 0.23 Dieldrin 0.23 Endrin
Bees	9/14-17	2325	T Lindane 0.4 p,p DDT 0.3 o,p DDT 0.15 p,p DDE 0.5 o,p DDE 0.34 Dieldrin 0.6 Endrin 0.13 Heptachlor 1.3 Parathion
Pollen - Vial 1	9/22	2500	N
Nectar	9/22	2501	N
Bees	9/21	2504	0.1 Aldrin 0.2 Lindane 0.15 p,p DDT 0.13 o,p DDT 0.7 DDE 0.49 o,p DDE 0.3 Dieldrin 0.14 Heptachlor 0.51 Methyl Parathion 0.59 Parathion
Pollen - Hive 6 Vial 1	8/14	2674	1.4 Dieldrin
Pollen - Hive 6 Vial 2	8/14	2675	N
Pollen - Hive 6 Vial 3	8/14	2676	N

GRA - Apiary Samples (Cont'd.)

Material sampled	Date 1964	Log number	Pesticides found ppm
Pollen - Hive 6 Vial 4	8/14	G4-2677	0.55 o,p DDE 0.5 Heptachlor Epox.
Pollen - Hive 6 Vial 5	8/14	2678	1.0 p,p DDT 2.3 p,p DDE 1.8 o,p DDE
Pollen - Hive 6 Vial 6	8/14	2679	10.2 p,p DDT 3.9 o,p DDT 8.2 o,p DDE
Pollen - Hive 6 Vial 1	10/13	2689	N
Pollen - Hive 6 Vial 2	10/13	2690	N
Pollen - Hive 6 Vial 3	10/13	2691	N
Pollen - Hive 6 Vial 4	10/13	2692	0.46 Aldrin 3.2 o,p DDE
Pollen - Hive 6 Vial 5	10/13	2693	0.9 p,p DDT
Pollen - Hive 6 Vial 1	8/4	2694	N
Pollen - Hive 6 Vial 2	8/4	2695	N
Pollen - Hive 6 Vial 3	8/4	2696	N
Pollen - Hive 6 Vial 4	8/4	2697	2.0 p,p DDT 1.4 o,p DDE
Pollen - Hive 6 Vial 5	8/4	2698	1.0 p,p DDT 0.5 o,p DDT 0.9 o,p DDE

GRA - Apiary Samples (Cont'd.)

Material sampled	Date 1964	Log number	Pesticides found ppm
Pollen - Hive 6 Vial 6	8/4	G4-2699	9.0 p,p DDT 13.0 p,p DDE 7.5 o,p DDE
Pollen - Hive 6 Vial 7	8/4	2700	0.14 Aldrin 0.44 p,p DDT 0.5 o,p DDE
Pollen - Hive 6 Vial 1	10/7	2701	1.47 p,p DDT 0.48 p,p DDE 0.5 o,p DDE
Pollen - Hive 6 Vial 3	10/7	2703	24.6 p,p DDT 13.2 p,p DDE 18.6 o,p DDE
Pollen - Hive 6 Vial 1	7/12	2704	N

Continuation of Form No. 100

1. Name of the person or organization

2. Address

3. City

4. State or Territory

5. Name of the person or organization
6. Address
7. City

8. State or Territory

9. City

10. Name of the person or organization
11. Address
12. City

13. Name of the person or organization
14. Address
15. City

16. State or Territory

17. City

18. Name of the person or organization
19. Address
20. City

21. Name of the person or organization
22. Address
23. City

24. State or Territory

25. Name of the person or organization
26. Address
27. City

28. Name of the person or organization
29. Address
30. City

31. Name of the person or organization
32. Address
33. City

34. Name of the person or organization
35. Address
36. City

GRA - Crop Samples

Material sampled	Date 1964	Log number	Pesticides found ppm
Soybeans - Block 3 Whole Plant	10/13	G4-2767	1.07 Dieldrin 0.66 Methyl Parathion
Milo - Block 5	9/5	2136	0.62 p,p DDE
Milo - Block 5	9/5	2139	0.35 Lindane 0.34 p,p DDT 0.23 o,p DDT 0.37 p,p DDE 0.8 o,p DDE
Soybeans - Block 6 Whole Plant	10/13	2768	0.36 Dieldrin 1.17 DEF
Milo - Block 7	9/5	2138	N
Soybeans - Block 11 Whole Plant	10/19	2765	N
Soybeans - Block 11 Whole Plant	10/19	2769	N
Soybeans - Block 12 Whole Plant	10/19	2772	N
Soybeans - Block 14 Whole Plant	10/19	2771	0.1 o,p DDT 0.32 DDE 0.37 Dieldrin 0.56 Methyl Parathion

ADDED 12/11/64

Forage (Grass) - Block 1	6/10	699	0.35 Lindane 0.28 p,p DDE 0.05 Dieldrin
Milo - Block 7	9/5	2137	0.35 Lindane 0.35 p,p DDT 0.08 p,p DDE
Soybeans - Block 6 Whole Plant	10/13	2770	0.24 Lindane 1.0 p,p DDT 0.36 o,p DDT 0.14 p,p DDE 0.16 o,p DDE 0.17 Dieldrin

1. General Information

General Information

Name of the person	Age	Sex	Date of birth
1. <u>John Doe</u>	25	M	1990-01-01
2. <u>Jane Smith</u>	30	F	1985-05-15
3. <u>Robert Johnson</u>	40	M	1975-08-20
4. <u>Mary White</u>	28	F	1991-03-10
5. <u>David Brown</u>	35	M	1988-07-05
6. <u>Sarah Green</u>	22	F	1997-02-28
7. <u>Michael Black</u>	38	M	1982-09-12
8. <u>Emily Davis</u>	27	F	1992-04-03
9. <u>Christopher Lee</u>	45	M	1973-11-25
10. <u>Amanda Hall</u>	29	F	1989-06-18
11. <u>James King</u>	33	M	1986-10-07
12. <u>Olivia Young</u>	24	F	1994-01-22
13. <u>Benjamin Clark</u>	42	M	1977-04-14
14. <u>Isabella Scott</u>	26	F	1993-07-29
15. <u>William Taylor</u>	37	M	1983-12-01
16. <u>Charlotte Baker</u>	21	F	1998-05-11
17. <u>Henry Wilson</u>	41	M	1978-08-24
18. <u>Amelia Moore</u>	23	F	1996-02-09
19. <u>Thomas Evans</u>	36	M	1987-06-27
20. <u>Evelyn Roberts</u>	20	F	1999-03-16
21. <u>George Harris</u>	43	M	1976-09-04
22. <u>Sophia Adams</u>	25	F	1994-11-19
23. <u>Lucas Baker</u>	39	M	1981-04-08
24. <u>Grace Miller</u>	27	F	1992-07-21
25. <u>Samuel Jones</u>	44	M	1974-10-30
26. <u>Lily King</u>	22	F	1997-01-13
27. <u>Benjamin Lee</u>	31	M	1988-05-26
28. <u>Chloe Davis</u>	24	F	1995-08-02
29. <u>Isaac Brown</u>	40	M	1979-11-17
30. <u>Abigail Green</u>	26	F	1993-03-24
31. <u>Robert White</u>	35	M	1984-06-10
32. <u>Madison Black</u>	21	F	1998-09-28
33. <u>David Clark</u>	38	M	1981-12-15
34. <u>Olivia Scott</u>	23	F	1996-04-06
35. <u>William Taylor</u>	42	M	1977-07-19
36. <u>Charlotte Baker</u>	20	F	1999-10-03
37. <u>Henry Wilson</u>	41	M	1978-12-20
38. <u>Amelia Moore</u>	25	F	1994-03-07
39. <u>Thomas Evans</u>	36	M	1987-05-23
40. <u>Evelyn Roberts</u>	22	F	1997-08-14
41. <u>George Harris</u>	43	M	1976-11-01
42. <u>Sophia Adams</u>	24	F	1995-02-18
43. <u>Lucas Baker</u>	39	M	1981-05-05
44. <u>Grace Miller</u>	27	F	1992-08-22
45. <u>Samuel Jones</u>	44	M	1974-11-09
46. <u>Lily King</u>	22	F	1997-02-26
47. <u>Benjamin Lee</u>	31	M	1988-05-13
48. <u>Chloe Davis</u>	24	F	1995-08-30
49. <u>Isaac Brown</u>	40	M	1979-11-16
50. <u>Abigail Green</u>	26	F	1993-04-03
51. <u>Robert White</u>	35	M	1984-07-20
52. <u>Madison Black</u>	21	F	1998-10-07
53. <u>David Clark</u>	38	M	1981-12-24
54. <u>Olivia Scott</u>	23	F	1996-03-11
55. <u>William Taylor</u>	42	M	1977-06-28
56. <u>Charlotte Baker</u>	20	F	1999-09-14
57. <u>Henry Wilson</u>	41	M	1978-12-01
58. <u>Amelia Moore</u>	25	F	1994-04-18
59. <u>Thomas Evans</u>	36	M	1987-07-05
60. <u>Evelyn Roberts</u>	22	F	1997-10-22
61. <u>George Harris</u>	43	M	1976-01-09
62. <u>Sophia Adams</u>	24	F	1995-04-26
63. <u>Lucas Baker</u>	39	M	1981-07-13
64. <u>Grace Miller</u>	27	F	1992-10-30
65. <u>Samuel Jones</u>	44	M	1974-01-16
66. <u>Lily King</u>	22	F	1997-04-03
67. <u>Benjamin Lee</u>	31	M	1988-07-20
68. <u>Chloe Davis</u>	24	F	1995-10-07
69. <u>Isaac Brown</u>	40	M	1979-12-24
70. <u>Abigail Green</u>	26	F	1993-03-11
71. <u>Robert White</u>	35	M	1984-06-28
72. <u>Madison Black</u>	21	F	1998-09-14
73. <u>David Clark</u>	38	M	1981-12-01
74. <u>Olivia Scott</u>	23	F	1996-04-18
75. <u>William Taylor</u>	42	M	1977-07-05
76. <u>Charlotte Baker</u>	20	F	1999-10-22
77. <u>Henry Wilson</u>	41	M	1978-01-09
78. <u>Amelia Moore</u>	25	F	1994-04-26
79. <u>Thomas Evans</u>	36	M	1987-07-13
80. <u>Evelyn Roberts</u>	22	F	1997-10-30
81. <u>George Harris</u>	43	M	1976-01-16
82. <u>Sophia Adams</u>	24	F	1995-04-03
83. <u>Lucas Baker</u>	39	M	1981-07-20
84. <u>Grace Miller</u>	27	F	1992-10-07
85. <u>Samuel Jones</u>	44	M	1974-12-24
86. <u>Lily King</u>	22	F	1997-03-11
87. <u>Benjamin Lee</u>	31	M	1988-06-28
88. <u>Chloe Davis</u>	24	F	1995-09-14
89. <u>Isaac Brown</u>	40	M	1979-12-01
90. <u>Abigail Green</u>	26	F	1993-04-18
91. <u>Robert White</u>	35	M	1984-07-05
92. <u>Madison Black</u>	21	F	1998-10-22
93. <u>David Clark</u>	38	M	1981-01-09
94. <u>Olivia Scott</u>	23	F	1996-04-26
95. <u>William Taylor</u>	42	M	1977-07-13
96. <u>Charlotte Baker</u>	20	F	1999-10-30
97. <u>Henry Wilson</u>	41	M	1978-01-16
98. <u>Amelia Moore</u>	25	F	1994-04-03
99. <u>Thomas Evans</u>	36	M	1987-07-20
100. <u>Evelyn Roberts</u>	22	F	1997-10-07

GRA - Miscellaneous Samples

Material sampled	Date 1964	Log number	Pesticides found	
			ppb	ppm
Soil Insects - Block 8	6/29	G4-784		N
Soil Insects - Block 1	7/9	813		N
Water - Used to wash bee supers	8/18	1536	N	
Algae - Location 5	8/14	1690		0.26 Methyl Parathion
Snake - Location 5	9/10	2223		T p,p DDT 0.18 p,p DDE

ADDED 12/11/64

Turtle - Location 4 (<u>Chrysemys picta belli</u> (Gray))	8/18	1678		0.26 Lindane T p,p DDE 0.24 o,p DDE T Dieldrin T Endrin
Turtles - Location 4 (<u>Chrysemys picta belli</u> (Gray))	9/23	2486		0.21 Lindane 0.12 p,p DDE 0.3 o,p DDE 0.12 Dieldrin
Mice - Block 4	8/27	1852		0.27 Lindane 0.79 p,p DDT 0.27 o,p DDT 0.1 p,p DDE 0.38 o,p DDE 0.23 Dieldrin T Endrin
Minnows - Location 5	8/12	1454		3.1 p,p DDT 3.8 o,p DDT 1.83 o,p DDE 0.55 p,p DDE 0.31 Dieldrin
Frogs - Location 6	8/10	1455		0.15 o,p DDT 0.15 Endrin
Tadpoles - Location 6	8/25	1853		0.29 o,p DDT

GRA - Miscellaneous Samples (Cont'd.)

Material sampled	Date 1964	Log number	Pesticides found	
			ppb	ppm
<u>ADDED 12/11/64</u>				
Fish - Location 6	9/10	G4-2222		0.35 Lindane 0.21 p,p DDT 1.07 o,p DDT 0.35 p,p DDE 0.11 Dieldrin
Pollen - Block 9	10/7	2789		N
Snake - Location 4	8/12	1457		0.21 Lindane 0.44 p,p DDT 0.28 o,p DDT 0.63 p,p DDE 0.28 Dieldrin 0.13 Endrin
Queen Bees - Block 9	9/22	2502	(A)	Hive 6 T Lindane T p,p DDT T o,p DDE 0.36 Dieldrin
			(B)	Hive 62 T Lindane 0.12 p,p DDT T p,p DDE T o,p DDE 0.3 Dieldrin 0.33 Endrin

Year	Volume	Page	Author	Title
------	--------	------	--------	-------

ARTICLES

1. *On the Pathology of the Heart*
 2. *On the Pathology of the Lungs*
 3. *On the Pathology of the Liver*
 4. *On the Pathology of the Spleen*
 5. *On the Pathology of the Kidneys*

ORIGINAL ARTICLES

1. *On the Pathology of the Heart*
 2. *On the Pathology of the Lungs*
 3. *On the Pathology of the Liver*
 4. *On the Pathology of the Spleen*
 5. *On the Pathology of the Kidneys*

1. *On the Pathology of the Heart*
 2. *On the Pathology of the Lungs*
 3. *On the Pathology of the Liver*
 4. *On the Pathology of the Spleen*
 5. *On the Pathology of the Kidneys*

1. *On the Pathology of the Heart*
 2. *On the Pathology of the Lungs*
 3. *On the Pathology of the Liver*
 4. *On the Pathology of the Spleen*
 5. *On the Pathology of the Kidneys*

BIOLOGICAL RECORD

LIGHT TRAP COLLECTIONS

Indicator Species	Totals-Operated One Night Per Week								Aug. 6	Aug. 13
	June 17	June 26	July 2	July 9	July 16	July 23	July 30			
Click beetles	16	6	200+	247+	3	13	7	23	0	
<u>Calosoma</u> spp. (Predatory ground beetles)	3	0	0	9	5	3	3	4	0	
Blister beetles	40	0	58	18	20	22	2	3	1	
<u>Dyscinetus</u> spp. and <u>Cyclocephala</u> spp. (scarabs)	0	0	4	0	0	0	0	0	0	
Spotted cucumber beetle	2	2	6	47	2	7	29	29	0	
Tiger beetles	8	6	38	7	0	1	2	2	0	
Giant Water bug	0	0	0	0	0	0	0	0	0	
Southern green stink bug	3	0	1	10	0	0	5	0	0	
Treehoppers	0	0	0	0	0	0	0	0	0	
<u>Protoparce</u> spp. (hornworm moths)	2	1	5	0	1	3	12	1	2	
Salt-marsh caterpillar	0	0	0	0	1	3	2	9	3	

GRA

Light Traps Continued

2

Indicator Species	Aug. 20	Aug. 27	Totals-Operated One Night Per Week					Sept. 24	Oct. 1
			Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24		
Click beetles	2	4		0	2	7	0		0
<u>Calosoma spp. (Predatory ground beetles)</u>	2	0		0	0	1	0		1
Blisters beetles	11	2		2	1	0	0		0
<u>Dyscinetus spp. and Cyclocephala spp. (scarabs)</u>	0	0		0	0	0	0		0
Spotted cucumber beetle	1	1		3	3	5	0		0
Tiger beetles	6	2		0	0	0	0		0
Giant Water bug	0	0		0	0	0	0		0
Southern green stink bug	0	0		0	0	0	0		0
Treehoppers	0	0		0	0	0	0		0
<u>Protoparce spp. (hornworm moths)</u>	2	10		11	10	3	0		2
Salt-marsh caterpillar	5	8		30	23	9	2		0

GRA

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----

NUISANCE PESTS

CHIGGERS

(Average Number Per Chigger Board-Counts Made Once Per Week)													
July 4		July 11		July 14		July 29		Aug. 5		Aug. 12		Aug. 18	
S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
0	0	0	0	0	0	0	0	0	0	0	1	0	1

Aug. 25		Sept. 2		Sept. 9		Sept. 14		Sept. 21		Sept. 21		Oct. 1	
S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
0	3	0	0	0	0	2	0	0	0	0	0	0	2

S1=Sample One
S2=Sample Two

GRA

BIOLOGICAL RECORD

NUISANCE PESTS

MOSQUITOES

(Total Larvae Per Five Dips-One Collection Weekly)													
July 4		July 10		July 15		July 26		July 30		Aug. 7		Aug. 12	
S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
3	8	0	0	1	5	0	25	25+	1	25+	0	25+	3

Aug. 20		Aug. 25		Sept. 4		Sept. 10		Sept. 15		Sept. 21		Oct. 1	
S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
0	0	0	0	0	0	0	0	10	0	0	0	10	0

S1=Sample One
S2=Sample Two

GRA

17-03-78 200
21-03-78 100

200

17-03-78 200

21-03-78 100

BIOLOGICAL RECORD

NUISANCE PESTS

HOUSE FLIES

(Average Per Grid-Counts Made Once Per Week)															
June 12		June 16		June 22		June 29		July 7		July 13		July 23		July 28	
S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
2	5	3	2	2	5	2	1	3	0	1	2	2	1	1	3

35 35
 35 35
 35 35

35 35
 35 35
 35 35

35

35

35 35
 35 35
 35 35

BIOLOGICAL RECORD

NUISANCE PESTS

TABANIDS

(Average Number Per Animal-Counts Made Once Per Week)																	
June		June 16		June 22		July 1		July 11		July 14		July 27		Aug. 4			
S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2		
4.4	4.8	.8	.4	0	0	0	0	.8	0	.4	0	.6	.4	1	0		

Aug. 10		Aug. 19		Aug. 20		Aug. 24		Sept. 2		Sept. 9		Sept. 15		Sept. 21		Oct. 1	
S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
4	0	.6	.4	.6	.4	0	.2	0	0	0	0	.2	.4	.2	0	.4	0

S1=Sample One
S2=Sample Two

GRA

BIOLOGICAL RECORD

NUISANCE PESTS

TICKS

(Adults and Nymphs Per Ten 100-Foot Drags-One Collection Weekly)															
June 16		June 24		July 4		July 11		July 14		July 28		Aug. 4		Aug. 12	
S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Aug. 18		Aug. 20		Aug. 25		Sept. 2		Sept. 9		Sept. 14		Sept. 21		Oct. 1	
S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

S1=Sample One
S2=Sample Two

GRA

1964 WEATHER DATA GRA

MAY

Date	Temperature		Humidity		Rain- fall
	Max.	Min.	Max.	Min.	
1	75	56	--	--	0
2	80	62	--	--	.70
3	80	58	--	--	0
4	81	61	--	--	0
5	81	61	--	--	0
6	84	61	--	--	0
7	84	67	--	--	0
8	85	66	--	--	T
9	87	69	--	--	0
10	80	68	--	--	.10
11	86	71	--	--	0
12	85	64	--	--	.05
13	84	55	--	--	T
14	79	53	--	--	0
15	78	51	--	--	0
16	83	54	--	--	0
17	87	57	--	--	0
18	90	59	--	--	0
19	93	63	--	--	0
20	93	68	--	--	0
21	92	66	--	--	T
22	95	66	--	--	0
23	92	68	--	--	.16
24	85	68	--	--	0
25	90	67	--	--	0
26	94	69	--	--	0
27	97	70	--	--	0
28	97	74	--	--	.02
29	88	53	--	--	T
30	80	58	--	--	.03
31	78	61	--	--	.42

JUNE

Date	Temperature		Humidity		Rain- fall
	Max.	Min.	Max.	Min.	
1	64	58	--	--	.17
2	76	55	--	--	0
3	82	59	--	--	0
4	83	56	--	--	0
5	89	58	--	--	0
6	89	63	--	--	0
7	89	63	--	--	0
8	94	69	--	--	0
9	93	70	--	46	0
10	96	76	98	41	0
11	97	74	98	32	0
12	100	75	97	38	T
13	99	75	91	37	0
14	96	76	88	36	0
15	97	73	98	36	0
16	97	76	100	45	.12
17	90	71	100	40	0
18	94	71	94	38	0
19	95	75	92	40	0
20	96	76	92	40	0
21	96	69	94	38	0
22	99	74	94	32	T
23	101	76	90	47	0
24	94	73	100	26	0
25	93	65	78	29	0
26	94	64	72	34	0
27	95	72	93	40	0
28	95	70	92	32	0
29	95	74	97	46	.71
30	94	70	100	54	.30

1964 WEATHER DATA GRA

JULY

Date	Temperature		Humidity		Rain- fall
	Max.	Min.	Max.	Min.	
1	88	70	100	46	0
2	92	72	100	50	0
3	87	69	100	64	.55
4	84	69	100	48	0
5	93	73	100	40	0
6	98	76	97	41	0
7	99	73	99	30	0
8	100	79	92	32	0
9	101	73	100	60	.38
10	90	68	100	61	0
11	90	74	100	70	.03
12	86	76	100	56	0
13	88	67	100	32	0
14	82	58	100	30	0
15	90	66	96	48	0
16	91	68	100	44	0
17	92	67	100	38	.08
18	94	71	99	34	0
19	94	69	100	34	0
20	98	73	96	40	0
21	98	75	-	37	0
22	97	74	96	35	0
23	95	71	99	38	T
24	95	72	100	44	0
25	95	74	100	40	0
26	96	73	97	52	0
27	93	70	100	46	.88
28	93	73	100	48	.10
29	93	75	98	52	0
30	92	72	100	56	.28
31	92	72	100	44	T

AUGUST

Date	Temperature		Humidity		Rain- fall
	Max.	Min.	Max.	Min.	
1	95	72	100	50	0
2	91	71	100	44	0
3	95	73	100	42	0
4	99	75	98	30	0
5	102	75	96	44	0
6	95	72	100	36	T
7	95	73	100	40	0
8	96	74	100	44	T
9	94	71	100	44	0
10	95	73	100	-	T
11	95	75	100	52	T
12	93	72	100	50	.90
13	80	58	100	38	.18
14	82	63	100	50	0
15	86	69	-	-	.03
16	88	69	100	63	3.00
17	76	66	100	82	.04
18	81	63	100	60	0
19	84	61	100	62	0
20	88	68	100	44	0
21	90	73	99	52	0
22	90	68	93	58	.15
23	84	72	97	64	0
24	88	71	99	60	T
25	88	71	100	57	.18
26	90	68	100	50	.45
27	87	65	100	52	.16
28	90	71	100	44	0
29	93	71	100	42	0
30	89	72	100	56	0
31	87	72	100	68	T

1964 WEATHER DATA GRA

SEPTEMBER

Date	Temperature		Humidity		Rain- fall
	Max.	Min.	Max.	Min.	
1	95	71	100	42	0
2	95	66	98	30	.21
3	94	64	100	32	0
4	96	70	100	37	0
5	96	69	100	40	0
6	95	70	100	38	0
7	92	71	100	50	T
8	92	68	100	46	T
9	93	65	100	37	0
10	92	61	100	36	0
11	90	67	100	52	0
12	79	62	94	34	0
13	76	57	74	38	0
14	81	46	100	30	0
15	86	47	100	33	0
16	85	64	100	52	T
17	80	69	100	88	.12
18	88	70	100	46	.09
19	90	63	100	46	0
20	92	64	100	40	0
21	91	68	100	45	0
22	90	66	100	50	0
23	86	68	100	56	0
24	82	64	86	28	0
25	85	50	100	25	0
26	87	54	100	31	0
27	85	72	100	72	T
28	59	56	100	100	0
29	67	59	100	90	2.30
30	72	62	100	82	.14

OCTOBER

Date	Temperature		Humidity		Rain- fall
	Max.	Min.	Max.	Min.	
1	80	60	100	70	0
2	82	68	100	70	0
3	76	66	98	81	0
4	72	58	100	36	0
5	64	50	72	34	.03
6	63	40	100	30	0
7	68	36	100	23	0
8	75	40	100	34	0
9	64	48	100	40	0
10	67	38	98	28	0
11	71	37	100	24	0
12	76	40	100	37	0
13	74	46	100	41	0
14	62	58	100	86	0
15	66	50	100	62	.93
16	77	48	100	44	0
17	84	55	100	40	0
18	84	52	100	46	0
19	62	42	90	22	0
20	64	34	100	26	0
21	76	38	100	22	0
22	78	42	100	30	0
23	69	45	72	28	0
24	72	40	98	28	0
25	75	38	100	28	0
26	76	44	100	40	0
27	80	50	100	50	0
28	79	54	100	50	0
29	80	52	100	48	0
30	72	50	100	30	0
31	72	42	100	34	0

1901

Temperature

Date		Time		Temperature	
1	100	100	100	100	100
2	100	100	100	100	100
3	100	100	100	100	100
4	100	100	100	100	100
5	100	100	100	100	100
6	100	100	100	100	100
7	100	100	100	100	100
8	100	100	100	100	100
9	100	100	100	100	100
10	100	100	100	100	100
11	100	100	100	100	100
12	100	100	100	100	100
13	100	100	100	100	100
14	100	100	100	100	100
15	100	100	100	100	100
16	100	100	100	100	100
17	100	100	100	100	100
18	100	100	100	100	100
19	100	100	100	100	100
20	100	100	100	100	100
21	100	100	100	100	100
22	100	100	100	100	100
23	100	100	100	100	100
24	100	100	100	100	100
25	100	100	100	100	100
26	100	100	100	100	100
27	100	100	100	100	100
28	100	100	100	100	100
29	100	100	100	100	100
30	100	100	100	100	100
31	100	100	100	100	100
32	100	100	100	100	100
33	100	100	100	100	100
34	100	100	100	100	100
35	100	100	100	100	100
36	100	100	100	100	100
37	100	100	100	100	100
38	100	100	100	100	100
39	100	100	100	100	100
40	100	100	100	100	100
41	100	100	100	100	100
42	100	100	100	100	100
43	100	100	100	100	100
44	100	100	100	100	100
45	100	100	100	100	100
46	100	100	100	100	100
47	100	100	100	100	100
48	100	100	100	100	100
49	100	100	100	100	100
50	100	100	100	100	100
51	100	100	100	100	100
52	100	100	100	100	100
53	100	100	100	100	100
54	100	100	100	100	100
55	100	100	100	100	100
56	100	100	100	100	100
57	100	100	100	100	100
58	100	100	100	100	100
59	100	100	100	100	100
60	100	100	100	100	100
61	100	100	100	100	100
62	100	100	100	100	100
63	100	100	100	100	100
64	100	100	100	100	100
65	100	100	100	100	100
66	100	100	100	100	100
67	100	100	100	100	100
68	100	100	100	100	100
69	100	100	100	100	100
70	100	100	100	100	100
71	100	100	100	100	100
72	100	100	100	100	100
73	100	100	100	100	100
74	100	100	100	100	100
75	100	100	100	100	100
76	100	100	100	100	100
77	100	100	100	100	100
78	100	100	100	100	100
79	100	100	100	100	100
80	100	100	100	100	100
81	100	100	100	100	100
82	100	100	100	100	100
83	100	100	100	100	100
84	100	100	100	100	100
85	100	100	100	100	100
86	100	100	100	100	100
87	100	100	100	100	100
88	100	100	100	100	100
89	100	100	100	100	100
90	100	100	100	100	100
91	100	100	100	100	100
92	100	100	100	100	100
93	100	100	100	100	100
94	100	100	100	100	100
95	100	100	100	100	100
96	100	100	100	100	100
97	100	100	100	100	100
98	100	100	100	100	100
99	100	100	100	100	100
100	100	100	100	100	100



GRB



Farm Road

Block Border

Block

Acres

Water & Silt Sampling
Locations

Bees



CHIRKIN



100-100



LEGEND

- Analysis incomplete - These samples will be re-examined
in light of improved techniques.
- Arsenic - All arsenic analyses are reported
as metallic arsenic. If no figure
is given, it means that arsenic was
not run on that particular sample.
- N - Less than 0.05 p.p.b. in water, or
less than 0.05 p.p.m. in other
samples. If only arsenic analysis
is reported, it means that the
sample was negative for chlorinated
hydrocarbons.
- p.p.b. - Parts per billion.
- p.p.m. - Parts per million.
- T - Trace is less than 0.10 p.p.b. in
water, or less than 0.10 p.p.m.
in all other samples.

Note: Analysis of phosphates were made only on
selected samples.

CHEMICAL TREATMENT HISTORY
Pounds Of Technical Material Per Acre

GRB - Block 1 (131 Acres of cotton)				
Date applied	DDT	Diuron	Methyl Parathion	Sodium Chlorate
1959-1963	0.5		0.25	Applied 10 times a year.
1964				
6/26	0.33		0.18	
7/6		0.75		
8/3	0.5		0.25	
8/7	0.5		0.25	
8/13	0.5		0.25	
8/18	1.0		0.25	
8/24	1.0		0.25	
8/25	1.0		0.25	
8/31	1.0		0.25	
9/1	1.0		0.25	
9/7	1.0		0.25	
9/21				3.0

1900

1900

1900

1900

1900

1900

1900

1900

1900

GRB - Soil Samples

GRB - Block 1

Date sampled 1964	Log number	Pesticides found ppm
6/2	G4-61	0.05 Lindane 3.86 p,p DDT T o,p DDT 0.25 DDE 8.8 Arsenic
6/2	62	0.35 p,p DDT 0.12 o,p DDT T DDE 9.6 Arsenic
6/22	300	2.76 p,p DDT 0.3 o,p DDT 0.1 DDE 10.9 Arsenic
6/22	301	1.84 p,p DDT 0.37 o,p DDT 0.61 DDE 9.1 Arsenic
7/18	858	1.3 p,p DDT 0.93 o,p DDT 0.27 DDE 11.6 Arsenic
7/18	859	T Lindane 1.25 p,p DDT 0.58 o,p DDT 0.38 DDE T Dielldrin 3.9 Arsenic
8/21	1753	T Lindane 1.09 p,p DDT 0.7 o,p DDT 0.16 DDE
8/21	1754	1.04 p,p DDT T o,p DDT T DDE
8/27	1755	3.0 p,p DDT 0.77 o,p DDT 0.26 DDE

GRB - Soil Samples

GRB - Block 1 (Cont'd.)

<u>Date sampled</u> <u>1964</u>	<u>Log</u> <u>number</u>	<u>Pesticides found</u> <u>ppm</u>
8/27	G4-1756	T Lindane 4.78 p,p DDT T o,p DDT T DDE
8/27	1757	Analysis incomplete
9/10	2084	T Lindane 1.01 p,p DDT 0.5 o,p DDT 0.21 DDE
9/10	2086	T Lindane 1.2 p,p DDT 0.58 o,p DDT 0.2 DDE

BIOLOGICAL RECORD

SWEEP NET

BLOCK 1-COTTON

		Totals Per 100 Sweeps-One Collection Per Week									
Indicator	:	June	June	July	July	July	July	July	Sept.	Sept.	Oct.
Species	:	18	25	4	9	13	24	30	5		
Grasshoppers	:	0	1	0	0	0	0	0	0		0
Lady beetles	:	0	0	0	0	0	1	0	0		0
Bumble bees	:	0	0	0	0	0	0	0	0		0

	:	Aug.	Aug.	Aug.	Sept.	Sept.	Sept.	Sept.	Sept.	Oct.	
	:	12	21	27	2	7	14	23	5		
Grasshoppers	:	0	0	0	0	0	0	0	0		0
Lady beetles	:	0	0	0	0	0	0	0	0		0
Bumble bees	:	0	0	0	0	0	0	0	0		0

GRB



BIOLOGICAL RECORD

PITFALL TRAPS

BLOCK 1-COTTON

Indicator Species	Total Number Per Composite (3 Traps)										Sample-Collected Bi-Weekly			
	June 20*		July 5		July 14		Aug. 1		Aug. 28		Sept. 11		Sept. 21	
	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
Ants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiders	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Ground beetles	0	0	0	0	0	0	3	0	1	0	0	1	0	0
Earwigs	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rove beetles	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Field crickets	0	0	0	0	1	0	2	0	0	0	0	0	0	0

*Only one sample taken.

S1=Sample One
S2=Sample Two

GRB

BIOLOGICAL RECORD

SOIL SAMPLES

BLOCK 1-COTTON

		Totals Per Sample-Five 5-Inch Cores (One Foot Deep) Collected Monthly							
Indicator Species		July 9		July 21		Aug. 12		Sept. 8	
		S1	S2	S1	S2	S1	S2	S1	S2
White Grubs	:	0	0	0	0	0	0	0	0
Wireworms	:	0	0	0	0	0	0	0	0
Earthworms	:	0	0	0	0	0	0	0	0
	:								

S1=Sample One
S2=Sample Two

GRB

CHEMICAL TREATMENT HISTORY
Pounds Of Technical Material Per Acre

GRB - Block 2 (44 Acres of cotton)							
Date applied	DDT	Disodium Methyl Arsonate	Methyl Parathion	Sodium Chlorate	Remarks		
1959-1960	0.5		0.25		Applied 10 times a year.		
1961-1963					None applied.		
1964							
6/17		1.0					
6/29	0.33		0.18				
8/3	0.5		0.25				
8/7	0.5		0.25				
8/13	0.5		0.25				
8/18	1.0		0.25				
8/25	1.0		0.25				
8/31	1.0		0.25				
9/1	1.0		0.25				
9/7	1.0		0.25				
10/7				3.0			

GRB - Soil Samples

GRB - Block 2

Date Sampled 1964	Log number	Pesticides found ppm
6/2	G4-63	1.06 p,p DDT T DDE 8.5 Arsenic
6/2	64	1.14 p,p DDT 8.7 Arsenic
6/30	365	0.96 p,p DDT 8.9 Arsenic
6/30	366	0.96 p,p DDT 9.1 Arsenic
7/18	860	2.8 p,p DDT 8.6 Arsenic
7/18	861	0.81 p,p DDT 0.29 o,p DDT 0.2 DDE 6.4 Arsenic
8/10	1389	1.9 p,p DDT 0.88 o,p DDT 0.42 DDE 0.18 Endrin 8.5 Arsenic
8/10	1388	0.9 p,p DDT 0.41 o,p DDT 0.15 DDE 9.5 Arsenic
9/15	2261	2.9 p,p DDT 1.6 o,p DDT 0.39 DDE
9/15	2263	0.9 p,p DDT 0.3 o,p DDT T Dieldrin Analysis incomplete

BIOLOGICAL RECORD

SWEEP NET

BLOCK 2-COTTON

Totals Per 100 Sweeps-One Collection Per Week										
Indicator Species	June 25	July 4	July 9	July 13	July 24	July 30	Aug. 5	Aug. 12		
Grasshoppers	0	0	0	0	0	0	0	0	0	
Lady beetles	0	0	0	0	0	0	0	0	0	
Bumble bees	0	0	0	0	0	0	0	0	0	

	Aug. 21	Aug. 27	Sept. 2	Sept. 7	Sept. 14	Sept. 23	Oct. 5			
Grasshoppers	0	0	0	0	0	0	0	0	0	
Lady beetles	0	0	0	0	0	0	0	0	0	
Bumble bees	0	0	0	0	0	0	0	0	0	

GRB

CHEMICAL TREATMENT HISTORY
Pounds Of Technical Material Per Acre

GRB - Block 3 (50 Acres of soybeans)

Date applied	DDT	Methyl Parathion	Remarks
1959-1960	0.5	0.25	Applied 10 times a year.
1961-1963			None applied.
1964 9/8		1.0	

GRB - Soil Samples

GRB - Block 3

Date sampled 1964	Log number	Pesticides found ppm
6/2	G4-65	1.3 p,p DDT 0.13 DDE 12.5 Arsenic
6/2	66	1.1 p,p DDT 12.3 Arsenic
6/23	302	0.9 p,p DDT 0.11 o,p DDT 11.0 Arsenic
6/23	303	0.97 p,p DDT 0.15 o,p DDT 10.6 Arsenic
7/20	862	0.48 p,p DDT 0.24 o,p DDT 0.17 DDE 11.2 Arsenic
7/20	863	9.5 Arsenic T Lindane 0.56 p,p DDT 0.41 o,p DDT 0.18 DDE
8/31	1930	0.81 p,p DDT 0.36 o,p DDT 0.11 DDE T Endrin 0.03 Methyl Parathion
8/31	1931	1.4 p,p DDT 1.3 o,p DDT 0.13 DDE T Dieldrin
10/6	2618	Analysis incomplete
10/6	2621	0.94 p,p DDT 0.62 o,p DDT 0.16 DDE

BIOLOGICAL RECORD

SWEEP NET

BLOCK 3-SOYBEANS

Totals Per 100 Sweeps-One Collection Per Week									
Indicator	June	July	July	July	Sept.	Sept.	Sept.	Aug.	Aug.
Species	25	4	9	13	24	30	5	12	12
Grasshoppers	0	0	1	1	0	0	0	0	1
Lady beetles	0	0	0	0	0	0	0	0	0
Bumble bees	0	0	0	0	0	0	0	0	0

	Aug.	Aug.	Sept.	Sept.	Sept.	Sept.	Sept.	Oct.	Oct.
	19	26	2	7	14	23	5		
Grasshoppers	1	0	0	0	0	0	0	0	0
Lady beetles	0	0	0	0	0	0	0	0	0
Bumble bees	0	0	0	0	0	0	0	0	0

GRB

BIOLOGICAL RECORD

PITFALL TRAPS

BLOCK 3-SOYBEANS

Indicator Species	June 18*		July 5		July 14		July 29		Aug. 11		Aug. 26		Sept. 11		Sept. 21	
	S1 S2		S1 S2		S1 S2		S1 S2		S1 S2		S1 S2		S1 S2		S1 S2	
	Total Number Per Composite (3 Traps)		Sample-Collected B1-Weekly													
Ants	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiders	1	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0
Ground beetles	4	5	1	20	15	10	10	5	7	1	0	0	0	0	1	0
Earwigs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rove beetles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Field crickets	0	16	0	0	2	2	2	2	2	2	0	0	2	0	0	1

*Only one sample taken.

S1=Sample One
S2=Sample Two

GRB

BIOLOGICAL RECORD

SOIL SAMPLES

BLOCK 3-SOYBEANS

		Totals Per Sample-Five 5-Inch Cores (One Foot Deep) Collected Monthly					
Indicator Species	July 9		July 17		Aug. 11		Sept. 8
	S1	S2	S1	S2	S1	S2	S1 S2
White Grubs	0	0	0	0	0	0	0 0
Wireworms	0	0	0	0	0	0	0 0
Earthworms	0	0	0	0	0	0	0 0

S1=Sample One
S2=Sample Two

GRB

CHEMICAL TREATMENT HISTORY
Pounds Of Technical Material Per Acre

GRB - Block 4 (92 Acres of cotton)			
Date applied	DDT	Methyl Parathion	Sodium Chlorate
1959-1961	0.5	0.25	Applied 10 times a year.
1962			None applied.
1963	0.5	0.25	Applied 10 times a year.
1964			Applications in 1964 covered 50 acres.
6/29	0.33	0.18	
7/31	0.5	0.25	
8/3	0.5	0.25	
8/7	0.5	0.25	
8/13	0.5	0.25	
8/18	1.0	0.25	
8/25	1.0	0.25	
8/31	1.0	0.25	
9/1	1.0	0.25	
9/7	1.0	0.25	
10/7			3.0

GRB - Soil Samples

GRB - Block 4

Date sampled 1964	Log number	Pesticides found ppm
6/3	G4-67	1.6 DDT 15.6 Arsenic
6/3	68	4.1 DDT 8.7 Arsenic
6/30	367	0.57 p,p DDT 0.5 o,p DDT 2.03 DDE 13.6 Arsenic
6/30	368	1.78 p,p DDT 0.17 o,p DDT T DDE 9.7 Arsenic
7/15	642	1.2 p,p DDT 0.64 o,p DDT 0.28 DDE 7.0 Arsenic
7/15	643	1.37 p,p DDT 0.64 o,p DDT 0.23 DDE 12.4 Arsenic
8/20	1603	1.26 p,p DDT 0.62 o,p DDT 0.12 DDE 0.58 Methyl Parathion
8/20	1604	1.06 p,p DDT 0.52 o,p DDT 0.19 DDE T Endrin 0.61 Methyl Parathion
9/15	2262	2.2 p,p DDT 1.3 o,p DDT 0.42 DDE 0.19 Methyl Parathion
9/15	2269	2.3 p,p DDT 1.8 o,p DDT 0.12 DDE 0.36 Methyl Parathion

Plated list - 1941

Name	Age	Address
John A. Smith	25	123 Main St.
Mary E. Jones	22	456 Oak St.
Robert L. Brown	28	789 Pine St.
Elizabeth C. White	20	101 Elm St.
James H. Green	24	202 Cedar St.
William D. Black	26	303 Birch St.
Margaret K. Taylor	19	404 Spruce St.
Charles F. Hall	27	505 Willow St.
Anna M. Young	21	606 Ash St.
Thomas R. King	23	707 Hickory St.
Lillian S. Scott	18	808 Walnut St.
George W. Adams	29	909 Chestnut St.
Helen J. Baker	20	1010 Maple St.
Frank P. Miller	25	1111 Poplar St.
Dorothy L. Wilson	19	1212 Sycamore St.
Edward G. Moore	26	1313 Magnolia St.
Betty H. Evans	18	1414 Dogwood St.
Richard A. Hill	24	1515 Redwood St.
Nancy B. Green	21	1616 Cypress St.
Joseph C. White	27	1717 Juniper St.
Alice D. Black	20	1818 Fir St.
Harold E. Brown	23	1919 Hemlock St.
Irene F. Jones	19	2020 Spruce St.
Clarence G. Smith	25	2121 Cedar St.
Mildred H. Taylor	18	2222 Birch St.
Walter I. King	26	2323 Willow St.
Evelyn J. Scott	20	2424 Ash St.
Roy L. Adams	24	2525 Hickory St.
Gladys M. Baker	19	2626 Walnut St.
Herbert N. Miller	25	2727 Maple St.
Frances O. Wilson	18	2828 Poplar St.
Arthur P. Moore	26	2929 Sycamore St.
Lorraine Q. Evans	20	3030 Magnolia St.
Donald R. Hill	24	3131 Dogwood St.
Marjorie S. Green	19	3232 Redwood St.
Kenneth T. White	25	3333 Cypress St.
Vivian U. Black	18	3434 Juniper St.

BIOLOGICAL RECORD

SWEEP NET

BLOCK 4-COTTON

Totals Per 100 Sweeps-One Collection Per Week									
Indicator	June	July	July	July	July	Sept.	Sept.	Sept.	Aug.
Species	25	4	9	13	24	7	14	24	5
Grasshoppers	0	0	0	0	0	0	0	0	0
Lady beetles	0	1	1	2	0	0	0	0	0
Bumble bees	0	0	0	0	0	0	0	0	0

	Aug.	Aug.	Sept.	Sept.	Sept.	Sept.	Sept.	Sept.	Oct.
	21	27	2	7	14	7	14	24	5
Grasshoppers	0	0	0	0	0	0	0	0	0
Lady beetles	0	0	0	0	0	0	0	0	0
Bumble bees	0	0	0	0	0	0	0	0	0

GRB

BIOLOGICAL RECORD

PITFALL TRAPS

BLOCK 4-COTTON

Indicator Species	Total Number Per Composite (3 Traps) Sample-Collected Bi-Weekly									
	June 20*		July 5		July 22		Aug. 6		Sept. 3	
	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
Ants	0	0	0	0	37	0	0	0	0	0
Spiders	2	0	0	0	0	0	1	1	0	0
Ground beetles	3	1	4	1	1	0	2	0	2	0
Earwigs	0	0	0	0	0	0	0	0	0	0
Rove beetles	0	0	0	0	1	0	0	0	0	0
Field crickets	0	1	0	2	2	0	0	0	0	0

*One sample taken.

S1=Sample One
S2=Sample Two

GRB

BIOLOGICAL RECORD

SOIL SAMPLES

BLOCK 4-COTTON

		Totals Per Sample-Five 5-Inch Cores (One Foot Deep) Collected Monthly					
Indicator Species	July 9		July 27		Aug. 20		Sept. 21
	S1	S2	S1	S2	S1	S2	S1 S2
White Grubs	0	0	0	0	0	0	0 0
Wireworms	0	0	0	0	0	0	0 0
Earthworms	0	0	0	0	0	0	0 0

S1=Sample One
S2=Sample Two

GRB

CHEMICAL TREATMENT HISTORY
Pounds Of Technical Material Per Acre

GRB - Block 5 (92 Acres of soybeans)		
Date applied	Toxaphene	Remarks
1959		None applied.
1960	2.0	
1961-1964		None applied.

GRB - Soil Samples

GRB - Block 5

Date sampled 1964	Log number	Pesticides found ppm
6/3	G4-69	T p,p DDT 11.9 Arsenic
6/3	70	12.5 Arsenic
6/3	71	2.7 Arsenic
6/30	369	0.12 p,p DDT 12.2 Arsenic
6/30	370	12.1 Arsenic
7/21	864	8.3 Arsenic
7/21	865	0.24 p,p DDT 0.14 o,p DDT T DDE 9.4 Arsenic
8/10	1390	0.41 p,p DDT 8.7 Arsenic
8/10	1391	0.86 p,p DDT 0.14 Dieldrin 13.6 Arsenic
9/8	2080	N
9/8	2082	N

BIOLOGICAL RECORD

SWEEP NET

BLOCK 5-SOYBEANS

Totals Per 100 Sweeps-One Collection Per Week									
Indicator	June 18	June 25	July 4	July 9	July 13	July 24	July 30	Aug. 5	
Species									
Grasshoppers	2	1	2	0	0	0	0	0	0
Lady beetles	0	0	1	0	1	0	0	0	0
Bumble bees	0	0	0	0	0	0	0	0	0

	Aug. 12	Aug. 19	Aug. 26	Sept. 2	Sept. 7	Sept. 14	Sept. 24	Oct. 5	
Grasshoppers	1	1	0	0	1	0	0	0	0
Lady beetles	0	0	0	0	0	0	0	0	0
Bumble bees	0	0	0	0	0	0	0	0	0

GRB

CHEMICAL TREATMENT HISTORY
Pounds Of Technical Material Per Acre

GRB - Block 6 (70 Acres of pasture)

Date applied	Ammonium Nitrate	Toxaphene	Remarks
1960		2.0	
1961-1963			None applied.
1964 10/20	32.0		

GRB - Soil Samples

GRB - Block 6

Date sampled 1964	Log number	Pesticides found ppm
6/3	G4-71	2.7 Arsenic
6/3	72	3.1 Arsenic
6/30	371	3.6 Arsenic
6/30	372	0.18 p,p DDT 3.7 Arsenic
7/16	644	0.14 DDE T Heptachlor 2.5 Arsenic
7/16	645	1.4 Arsenic
8/10	1392	0.25 p,p DDT 0.14 o,p DDT 0.14 DDE 3.2 Arsenic
8/10	1393	0.37 p,p DDT 0.14 o,p DDT 0.11 DDE 2.4 Arsenic
9/8	2081	0.14 p,p DDT 0.08 o,p DDT 0.34 DDE 0.28 Methyl Parathion
9/8	2083	0.1 Methyl Parathion

BIOLOGICAL RECORD

SWEEP NET

BLOCK 6-PASTURE

		Totals Per 100 Sweeps-One Collection Per Week									
Indicator	:	June	June	July	July	July	July	July	Sept.	Sept.	Aug.
Species	:	18	25	4	9	13	24	30	24	24	5
Grasshoppers	:	65	15	1	6	6	4	3	4	3	1
Lady beetles	:	1	0	0	0	0	0	0	0	0	0
Bumble bees	:	0	0	0	0	0	0	0	0	0	0

	:	Aug.	Aug.	Aug.	Sept.	Sept.	Sept.	Sept.	Sept.	Sept.	Oct.
	:	12	19	26	2	7	14	24	14	24	5
Grasshoppers	:	2	0	2	0	4	0	1	0	1	3
Lady beetles	:	0	0	0	0	0	0	0	0	0	0
Bumble bees	:	0	0	0	0	0	0	0	0	0	0

GRB

BIOLOGICAL RECORD

PITFALL TRAPS

BLOCK 6-PASTURE

Indicator Species	Total Number Per Composite (3 Traps) Sample-Collected Bi-Weekly													
	June 18*		June 30		July 22		Aug. 4		Aug. 19		Sept. 3		Sept. 16	
	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
Ants	1		12	0	5	0	0	0	0	0	0	3	7	5
Spiders	2		2	1	1	0	1	0	0	0	0	3	2	0
Ground beetles	0		0	2	1	0	0	2	2	5	0	0	0	0
Earwigs	0		0	0	0	0	0	0	0	0	0	0	0	0
Rove beetles	0		0	0	0	0	0	0	0	0	0	0	3	0
Field crickets	0		1	1	7	18	7	7	4	1	2	5	2	1

*Only one sample taken.

S1=Sample One
S2=Sample Two

GRB

BIOLOGICAL RECORD

SOIL SAMPLES

BLOCK 6-PASTURE

		Totals Per Sample-Five 5-Inch Cores (One Foot Deep) Collected Monthly					
Indicator Species	June 29		July 17		Aug. 19		Oct. 6
	S1	S2	S1	S2	S1	S2	S1 S2
White Grubs	0	0	0	0	0	1	0 0
Wireworms	0	1	0	0	0	0	0 0
Earthworms	0	0	0	0	0	0	0 0

S1=Sample One
S2=Sample Two

GRB

CHEMICAL TREATMENT HISTORY
Pounds Of Technical Material Per Acre

GRB - Block 7 (50 Acres of soybeans)		
Date applied	Toxaphene	Remarks
1959		None applied.
1960	2.0	
1961-1964		None applied.

GRB - Soil Samples

GRB - Block 7

Date sampled 1964	Log number	Pesticides found ppm
6/3	G4-73	4.0 Arsenic
6/3	74	3.5 Arsenic
7/9	554	4.9 Arsenic
7/9	555	4.6 Arsenic
7/28	980	0.34 p,p DDT T o,p DDT 4.2 Arsenic
7/28	981	0.3 p,p DDT T o,p DDT 0.15 DDE 3.5 Arsenic
8/31	1932	T p,p DDT T o,p DDT T DDE T Endrin
9/21	2459	0.13 p,p DDT
9/21	2462	N

Signal 1108	Signal 1109	Signal 1110
Signal 1108	Signal 1109	Signal 1110
Signal 1108	Signal 1109	Signal 1110
Signal 1108	Signal 1109	Signal 1110
Signal 1108	Signal 1109	Signal 1110
Signal 1108 Signal 1109 Signal 1110	Signal 1109	Signal 1110
Signal 1108 Signal 1109 Signal 1110	Signal 1109	Signal 1110
Signal 1108 Signal 1109 Signal 1110	Signal 1109	Signal 1110
Signal 1108	Signal 1109	Signal 1110
Signal 1108	Signal 1109	Signal 1110

BIOLOGICAL RECORD

SWEEP NET

BLOCK 7-SOYBEANS

		Totals Per 100 Sweeps-One Collection Per Week									
Indicator	:	June	June	July	July	July	July	July	Sept.	Sept.	Oct.
Species	:	19	25	4	9	13	24	30	5		
Grasshoppers	:	1	4	0	2	2	2	2	0		
Lady beetles	:	0	0	1	0	0	2	1	4		
Bumble bees	:	0	0	0	0	0	0	0	0		

	:	Aug.	Aug.	Aug.	Sept.	Sept.	Sept.	Sept.	Sept.	Oct.	
	:	12	19	26	2	7	14	23	5		
Grasshoppers	:	1	1	2	0	0	0	0	0		
Lady beetles	:	0	1	0	1	1	0	0	0		
Bumble bees	:	0	0	0	0	0	0	0	0		

GRB

CHEMICAL TREATMENT HISTORY
Pounds Of Technical Material Per Acre

GRB - Block 8 (39 Acres of oats)

Date applied	Toxaphene	Remarks
1959		None applied.
1960	2.0	
1961-1964		None applied.

GRB - Soil Samples

GRB - Block 8

Date sampled 1964	Log number	Pesticides found ppm
6/4	G4-75	3.4 Arsenic
6/4	76	5.3 Arsenic
7/8	556	5.9 Arsenic
7/8	557	3.9 Arsenic
7/21	866	0.11 Lindane T p,p DDT 0.14 o,p DDT 0.12 DDE 0.11 o,p DEE 0.11 Heptachlor 7.1 Arsenic
7/21	867	N
8/20	1605	N
8/20	1606	N
9/21	2460	T p,p DDT
9/21	2461	0.78 p,p DDT 0.11 DDE

Table of Contents

Page	Chapter	Page
1	Introduction	1
2	Chapter I	2
3	Chapter II	3
4	Chapter III	4
5	Chapter IV	5
6	Chapter V	6
7	Chapter VI	7
8	Chapter VII	8
9	Chapter VIII	9
10	Chapter IX	10
11	Chapter X	11
12	Chapter XI	12
13	Chapter XII	13
14	Chapter XIII	14
15	Chapter XIV	15
16	Chapter XV	16
17	Chapter XVI	17
18	Chapter XVII	18
19	Chapter XVIII	19
20	Chapter XIX	20
21	Chapter XX	21
22	Chapter XXI	22
23	Chapter XXII	23
24	Chapter XXIII	24
25	Chapter XXIV	25
26	Chapter XXV	26
27	Chapter XXVI	27
28	Chapter XXVII	28
29	Chapter XXVIII	29
30	Chapter XXIX	30
31	Chapter XXX	31
32	Chapter XXXI	32
33	Chapter XXXII	33
34	Chapter XXXIII	34
35	Chapter XXXIV	35
36	Chapter XXXV	36
37	Chapter XXXVI	37
38	Chapter XXXVII	38
39	Chapter XXXVIII	39
40	Chapter XXXIX	40
41	Chapter XL	41
42	Chapter XLI	42
43	Chapter XLII	43
44	Chapter XLIII	44
45	Chapter XLIV	45
46	Chapter XLV	46
47	Chapter XLVI	47
48	Chapter XLVII	48
49	Chapter XLVIII	49
50	Chapter XLIX	50
51	Chapter L	51
52	Chapter LI	52
53	Chapter LII	53
54	Chapter LIII	54
55	Chapter LIV	55
56	Chapter LV	56
57	Chapter LVI	57
58	Chapter LVII	58
59	Chapter LVIII	59
60	Chapter LIX	60
61	Chapter LX	61
62	Chapter LXI	62
63	Chapter LXII	63
64	Chapter LXIII	64
65	Chapter LXIV	65
66	Chapter LXV	66
67	Chapter LXVI	67
68	Chapter LXVII	68
69	Chapter LXVIII	69
70	Chapter LXIX	70
71	Chapter LXX	71
72	Chapter LXXI	72
73	Chapter LXXII	73
74	Chapter LXXIII	74
75	Chapter LXXIV	75
76	Chapter LXXV	76
77	Chapter LXXVI	77
78	Chapter LXXVII	78
79	Chapter LXXVIII	79
80	Chapter LXXIX	80
81	Chapter LXXX	81
82	Chapter LXXXI	82
83	Chapter LXXXII	83
84	Chapter LXXXIII	84
85	Chapter LXXXIV	85
86	Chapter LXXXV	86
87	Chapter LXXXVI	87
88	Chapter LXXXVII	88
89	Chapter LXXXVIII	89
90	Chapter LXXXIX	90
91	Chapter LXXXX	91
92	Chapter LXXXXI	92
93	Chapter LXXXXII	93
94	Chapter LXXXXIII	94
95	Chapter LXXXXIV	95
96	Chapter LXXXXV	96
97	Chapter LXXXXVI	97
98	Chapter LXXXXVII	98
99	Chapter LXXXXVIII	99
100	Chapter LXXXXIX	100
101	Chapter LXXXXX	101
102	Chapter LXXXXXI	102
103	Chapter LXXXXXII	103
104	Chapter LXXXXXIII	104
105	Chapter LXXXXXIV	105
106	Chapter LXXXXXV	106
107	Chapter LXXXXXVI	107
108	Chapter LXXXXXVII	108
109	Chapter LXXXXXVIII	109
110	Chapter LXXXXXIX	110
111	Chapter LXXXXXX	111
112	Chapter LXXXXXXI	112
113	Chapter LXXXXXXII	113
114	Chapter LXXXXXXIII	114
115	Chapter LXXXXXXIV	115
116	Chapter LXXXXXXV	116
117	Chapter LXXXXXXVI	117
118	Chapter LXXXXXXVII	118
119	Chapter LXXXXXXVIII	119
120	Chapter LXXXXXXIX	120
121	Chapter LXXXXXXX	121
122	Chapter LXXXXXXXI	122
123	Chapter LXXXXXXXII	123
124	Chapter LXXXXXXXIII	124
125	Chapter LXXXXXXXIV	125
126	Chapter LXXXXXXXV	126
127	Chapter LXXXXXXXVI	127
128	Chapter LXXXXXXXVII	128
129	Chapter LXXXXXXXVIII	129
130	Chapter LXXXXXXXIX	130
131	Chapter LXXXXXXXI	131
132	Chapter LXXXXXXXII	132
133	Chapter LXXXXXXXIII	133
134	Chapter LXXXXXXXIV	134
135	Chapter LXXXXXXXV	135
136	Chapter LXXXXXXXVI	136
137	Chapter LXXXXXXXVII	137
138	Chapter LXXXXXXXVIII	138
139	Chapter LXXXXXXXIX	139
140	Chapter LXXXXXXXI	140
141	Chapter LXXXXXXXII	141
142	Chapter LXXXXXXXIII	142
143	Chapter LXXXXXXXIV	143
144	Chapter LXXXXXXXV	144
145	Chapter LXXXXXXXVI	145
146	Chapter LXXXXXXXVII	146
147	Chapter LXXXXXXXVIII	147
148	Chapter LXXXXXXXIX	148
149	Chapter LXXXXXXXI	149
150	Chapter LXXXXXXXII	150
151	Chapter LXXXXXXXIII	151
152	Chapter LXXXXXXXIV	152
153	Chapter LXXXXXXXV	153
154	Chapter LXXXXXXXVI	154
155	Chapter LXXXXXXXVII	155
156	Chapter LXXXXXXXVIII	156
157	Chapter LXXXXXXXIX	157
158	Chapter LXXXXXXXI	158
159	Chapter LXXXXXXXII	159
160	Chapter LXXXXXXXIII	160
161	Chapter LXXXXXXXIV	161
162	Chapter LXXXXXXXV	162
163	Chapter LXXXXXXXVI	163
164	Chapter LXXXXXXXVII	164
165	Chapter LXXXXXXXVIII	165
166	Chapter LXXXXXXXIX	166
167	Chapter LXXXXXXXI	167
168	Chapter LXXXXXXXII	168
169	Chapter LXXXXXXXIII	169
170	Chapter LXXXXXXXIV	170
171	Chapter LXXXXXXXV	171
172	Chapter LXXXXXXXVI	172
173	Chapter LXXXXXXXVII	173
174	Chapter LXXXXXXXVIII	174
175	Chapter LXXXXXXXIX	175
176	Chapter LXXXXXXXI	176
177	Chapter LXXXXXXXII	177
178	Chapter LXXXXXXXIII	178
179	Chapter LXXXXXXXIV	179
180	Chapter LXXXXXXXV	180
181	Chapter LXXXXXXXVI	181
182	Chapter LXXXXXXXVII	182
183	Chapter LXXXXXXXVIII	183
184	Chapter LXXXXXXXIX	184
185	Chapter LXXXXXXXI	185
186	Chapter LXXXXXXXII	186
187	Chapter LXXXXXXXIII	187
188	Chapter LXXXXXXXIV	188
189	Chapter LXXXXXXXV	189
190	Chapter LXXXXXXXVI	190
191	Chapter LXXXXXXXVII	191
192	Chapter LXXXXXXXVIII	192
193	Chapter LXXXXXXXIX	193
194	Chapter LXXXXXXXI	194
195	Chapter LXXXXXXXII	195
196	Chapter LXXXXXXXIII	196
197	Chapter LXXXXXXXIV	197
198	Chapter LXXXXXXXV	198
199	Chapter LXXXXXXXVI	199
200	Chapter LXXXXXXXVII	200
201	Chapter LXXXXXXXVIII	201
202	Chapter LXXXXXXXIX	202
203	Chapter LXXXXXXXI	203
204	Chapter LXXXXXXXII	204
205	Chapter LXXXXXXXIII	205
206	Chapter LXXXXXXXIV	206
207	Chapter LXXXXXXXV	207
208	Chapter LXXXXXXXVI	208
209	Chapter LXXXXXXXVII	209
210	Chapter LXXXXXXXVIII	210
211	Chapter LXXXXXXXIX	211
212	Chapter LXXXXXXXI	212
213	Chapter LXXXXXXXII	213
214	Chapter LXXXXXXXIII	214
215	Chapter LXXXXXXXIV	215
216	Chapter LXXXXXXXV	216
217	Chapter LXXXXXXXVI	217
218	Chapter LXXXXXXXVII	218
219	Chapter LXXXXXXXVIII	219
220	Chapter LXXXXXXXIX	220
221	Chapter LXXXXXXXI	221
222	Chapter LXXXXXXXII	222
223	Chapter LXXXXXXXIII	223
224	Chapter LXXXXXXXIV	224
225	Chapter LXXXXXXXV	225
226	Chapter LXXXXXXXVI	226
227	Chapter LXXXXXXXVII	227
228	Chapter LXXXXXXXVIII	228
229	Chapter LXXXXXXXIX	229
230	Chapter LXXXXXXXI	230
231	Chapter LXXXXXXXII	231
232	Chapter LXXXXXXXIII	232
233	Chapter LXXXXXXXIV	233
234	Chapter LXXXXXXXV	234
235	Chapter LXXXXXXXVI	235
236	Chapter LXXXXXXXVII	236
237	Chapter LXXXXXXXVIII	237
238	Chapter LXXXXXXXIX	238
239	Chapter LXXXXXXXI	239
240	Chapter LXXXXXXXII	240
241	Chapter LXXXXXXXIII	241
242	Chapter LXXXXXXXIV	242
243	Chapter LXXXXXXXV	243
244	Chapter LXXXXXXXVI	244
245	Chapter LXXXXXXXVII	245
246	Chapter LXXXXXXXVIII	246
247	Chapter LXXXXXXXIX	247
248	Chapter LXXXXXXXI	248
249	Chapter LXXXXXXXII	249
250	Chapter LXXXXXXXIII	250
251	Chapter LXXXXXXXIV	251
252	Chapter LXXXXXXXV	252
253	Chapter LXXXXXXXVI	253
254	Chapter LXXXXXXXVII	254
255	Chapter LXXXXXXXVIII	255
256	Chapter LXXXXXXXIX	256
257	Chapter LXXXXXXXI	257
258	Chapter LXXXXXXXII	258
259	Chapter LXXXXXXXIII	259
260	Chapter LXXXXXXXIV	260
261	Chapter LXXXXXXXV	261
262	Chapter LXXXXXXXVI	262
263	Chapter LXXXXXXXVII	263
264	Chapter LXXXXXXXVIII	264
265	Chapter LXXXXXXXIX	265
266	Chapter LXXXXXXXI	266
267	Chapter LXXXXXXXII	267
268	Chapter LXXXXXXXIII	268
269	Chapter LXXXXXXXIV	269
270	Chapter LXXXXXXXV	270
271	Chapter LXXXXXXXVI	271
272	Chapter LXXXXXXXVII	272
273	Chapter LXXXXXXXVIII	273
274	Chapter LXXXXXXXIX	274
275	Chapter LXXXXXXXI	275
276	Chapter LXXXXXXXII	276
277	Chapter LXXXXXXXIII	277
278	Chapter LXXXXXXXIV	278
279	Chapter LXXXXXXXV	279
280	Chapter LXXXXXXXVI	280
281	Chapter LXXXXXXXVII	281
282	Chapter LXXXXXXXVIII	282
283	Chapter LXXXXXXXIX	283
284	Chapter LXXXXXXXI	284
285	Chapter LXXXXXXXII	285
286	Chapter LXXXXXXXIII	286
287	Chapter LXXXXXXXIV	287
288	Chapter LXXXXXXXV	288
289	Chapter LXXXXXXXVI	289
290	Chapter LXXXXXXXVII	290
291	Chapter LXXXXXXXVIII	291
292	Chapter LXXXXXXXIX	292
293	Chapter LXXXXXXXI	293
294	Chapter LXXXXXXXII	294
295	Chapter LXXXXXXXIII	295
296	Chapter LXXXXXXXIV	296
297	Chapter LXXXXXXXV	297
298	Chapter LXXXXXXXVI	298
299	Chapter LXXXXXXXVII	299
300	Chapter LXXXXXXXVIII	300
301	Chapter LXXXXXXXIX	301
302	Chapter LXXXXXXXI	302
303	Chapter LXXXXXXXII	303
304	Chapter LXXXXXXXIII	304
305	Chapter LXXXXXXXIV	305
306	Chapter LXXXXXXXV	306
307	Chapter LXXXXXXXVI	307
308	Chapter LXXXXXXXVII	308
309	Chapter LXXXXXXXVIII	309
310	Chapter LXXXXXXXIX	310
311	Chapter LXXXXXXXI	311
312	Chapter LXXXXXXXII	312
313	Chapter LXXXXXXXIII	313
314	Chapter LXXXXXXXIV	314
315	Chapter LXXXXXXXV	315
316	Chapter LXXXXXXXVI	316
317	Chapter LXXXXXXXVII	317
318	Chapter LXXXXXXXVIII	318
319	Chapter LXXXXXXXIX	319
320	Chapter LXXXXXXXI	320
321	Chapter LXXXXXXXII	321
322	Chapter LXXXXXXXIII	322
323	Chapter LXXXXXXXIV	323
324	Chapter LXXXXXXXV	324
325	Chapter LXXXXXXXVI	325
326	Chapter LXXXXXXXVII	326
327	Chapter LXXXXXXXVIII	327
328	Chapter LXXXXXXXIX	328
329	Chapter LXXXXXXXI	329
330	Chapter LXXXXXXXII	330
331	Chapter LXXXXXXXIII	331
332	Chapter LXXXXXXXIV	332
333	Chapter LXXXXXXXV	333
334	Chapter LXXXXXXXVI	334
335	Chapter LXXXXXXXVII	335
336	Chapter LXXXXXXXVIII	336
337	Chapter LXXXXXXXIX	337
338	Chapter LXXXXXXXI	338
339	Chapter LXXXXXXXII	339
340	Chapter LXXXXXXXIII	340
341	Chapter LXXXXXXXIV	341
342	Chapter LXXXXXXXV	342
343	Chapter LXXXXXXXVI	343
344	Chapter LXXXXXXXVII	344
345	Chapter LXXXXXXXVIII	345
346	Chapter LXXXXXXXIX	346
347	Chapter LXXXXXXXI	347
348	Chapter LXXXXXXXII	348
349	Chapter LXXXXXXXIII	349
350	Chapter LXXXXXXXIV	350
351	Chapter LXXXXXXXV	351
352	Chapter LXXXXXXXVI	352
353	Chapter LXXXXXXXVII	353
354	Chapter LXXXXXXXVIII	354
355	Chapter LXXXXXXXIX	355
356	Chapter LXXXXXXXI	356
357	Chapter LXXXXXXXII	357
358	Chapter LXXXXXXXIII	358
359	Chapter LXXXXXXXIV	359
360	Chapter LXXXXXXXV	360
361	Chapter LXXXXXXXVI	361
362	Chapter LXXXXXXXVII	362
363	Chapter LXXXXXXXVIII	363
364	Chapter LXXXXXXXIX	364
365	Chapter LXXXXXXXI	365
366	Chapter LXXXXXXXII	366
367	Chapter LXXXXXXXIII	367
368	Chapter LXXXXXXXIV	368
369	Chapter LXXXXXXXV	369
370	Chapter LXXXXXXXVI	370
371	Chapter LXXXXXXXVII	371
372	Chapter LXXXXXXXVIII	372
373	Chapter LXXXXXXXIX	373
374	Chapter LXXXXXXXI	374
375	Chapter LXXXXXXXII	375
376	Chapter LXXXXXXXIII	376
377	Chapter LXXXXXXXIV	377
378	Chapter LXXXXXXXV	378
379	Chapter LXXXXXXXVI	379
380	Chapter LXXXXXXXVII	380
381	Chapter LXXXXXXXVIII	381
382	Chapter LXXXXXXXIX	382
383	Chapter LXXXXXXXI	383
384	Chapter LXXXXXXXII	384
385	Chapter LXXXXXXXIII	385
386	Chapter LXXXXXXXIV	386
387	Chapter LXXXXXXXV	387
388	Chapter LXXXXXXXVI	388
389		

BIOLOGICAL RECORD

SWEEP NET

BLOCK 8-OATS

Indicator Species	Totals Per 100 Sweeps-One Collection Per Week									
	June 19	June 25	July 4	July 9	July 13	July 24	July 30	Aug. 5		
Grasshoppers	1	0	0	0	0	1	0	0		
Lady beetles	0	2	3	3	2	12	5	1		
Bumble bees	0	0	0	0	0	0	0	0		

	Aug. 12	Aug. 19	Aug. 26	Sept. 2	Sept. 7	Sept. 14	Sept. 23	Oct. 5		
Grasshoppers	0	0	0	0	3	0	0	0		
Lady beetles	0	0	0	0	0	0	0	0		
Bumble bees	0	0	0	0	0	0	0	0		

GRB

BIOLOGICAL RECORD

PITFALL TRAPS

BLOCK 8-OATS

Indicator Species	Total Number Per Composite (3 Traps)										Sample-Collected Bi-Weekly				Sept.		Sept.		Oct.	
	June 18*		June 30*		July 5*		July 22		Aug. 4		Aug. 21		Sept. 3		Sept. 16		Sept. 16		Oct. 7	
	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
Ants	0	0	0	0	0	0	10	2	0	0	0	0	0	0	0	0	0	0	3	17
Spiders	0	0	0	0	0	0	0	0	0	1	2	1	4	0	0	0	0	0	1	1
Ground beetles	23	0	5	0	13	0	0	1	1	2	10	8	3	1	3	2	3	2	18	12
Earwigs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rove beetles	0	0	0	0	0	1	0	0	1	0	1	1	0	0	0	0	0	0	0	1
Field crickets	4	0	0	0	1	1	2	1	1	2	23	1	3	0	1	1	1	1	74	2

*Only one sample taken.

S1=Sample One

S2=Sample Two

GRB

BIOLOGICAL RECORD

SOIL SAMPLES

BLOCK 8-OATS

		Totals Per Sample-Five 5 Inch Cores (One Foot Deep) Collected Monthly							
Indicator Species		June		July		Aug.		Sept.	
		30		27		20		21	
		S1	S2	S1	S2	S1	S2	S1	S2
White Grubs	:	0	0	1	3	0	0	0	0
Wireworms	:	0	0	0	0	0	0	0	0
Earthworms	:	0	5	0	0	0	0	0	0
	:								

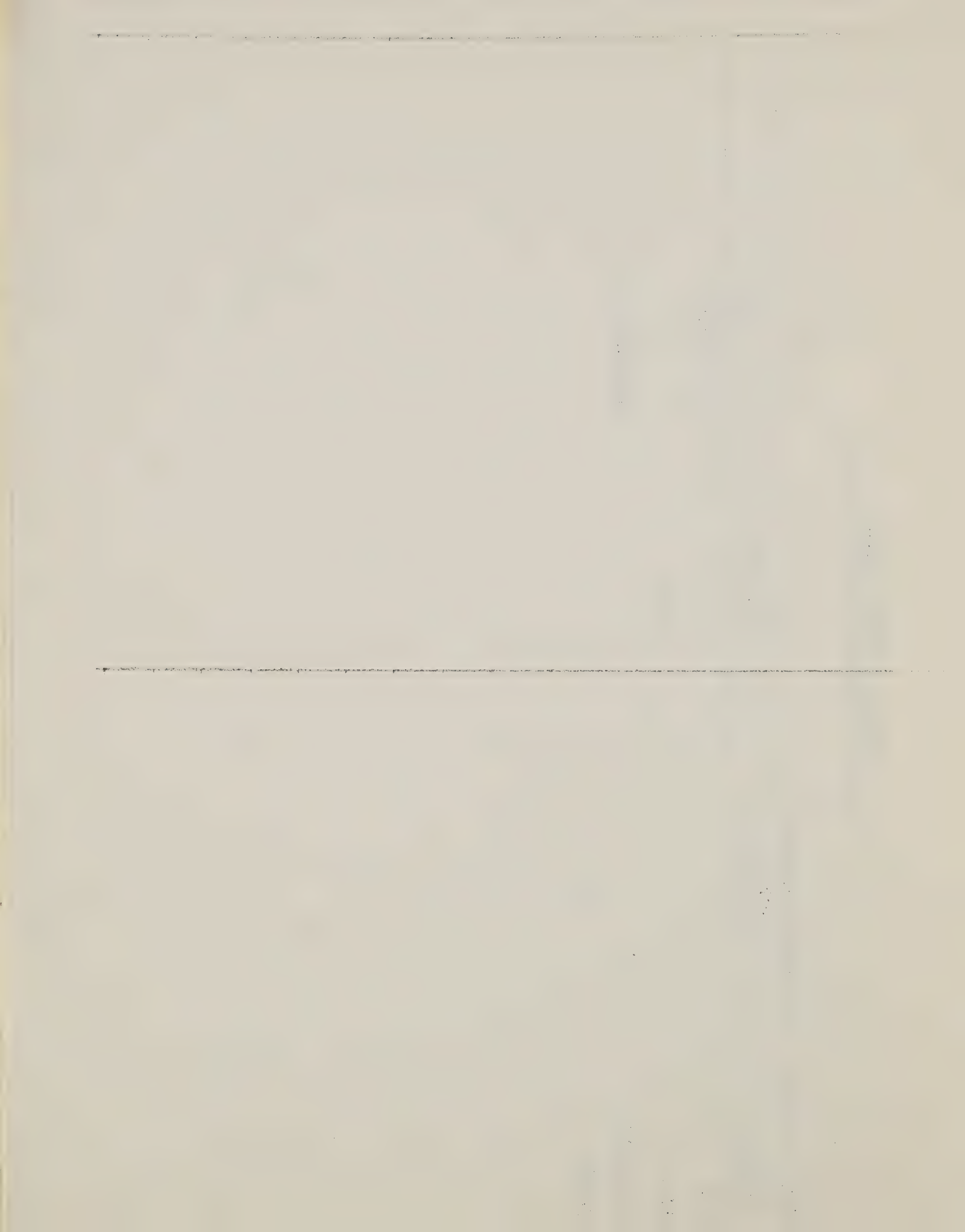
S1=Sample One
S2=Sample Two

GRB

CHEMICAL TREATMENT HISTORY
Pounds Of Technical Material Per Acre

GRB - Block 9 (79 Acres of soybeans)

Date applied	Methyl Parathion	Toxaphene	Remarks
1959			None applied.
1960		2.0	
1961-1963			None applied.
9/9/64	1.0		



GRB - Soil Samples

GRB - Block 9

Date sampled 1964	Log number	Pesticides found ppm
6/4	G4-77	T p,p DDT 5.0 Arsenic
6/4	78	5.8 Arsenic
7/8	558	5.9 Arsenic
7/8	559	5.5 Arsenic
7/27	982	5.5 Arsenic
7/27	983	5.2 Arsenic
8/24	1760	N
8/24	1761	N
10/6	2617	0.15 p,p DDT T o,p DDT T DDE
10/6	2619	0.15 p,p DDT 0.11 o,p DDT

BIOLOGICAL RECORD

SWEEP NET

BLOCK 9-SOYBEANS

		Totals Per 100 Sweeps-One Collection Per Week									
Indicator	:	June	June	July	July	July	July	July	Sept.	Sept.	Aug.
Species	:	19	25	4	9	13	24	30	23	5	
Grasshoppers	:	0	0	0	0	3	1	0	0	1	
Lady beetles	:	0	0	0	0	0	0	0	0	0	
Bumble bees	:	0	0	0	0	0	0	0	0	0	

	:	Aug.	Aug.	Aug.	Sept.	Sept.	Sept.	Sept.	Sept.	Oct.	
	:	12	19	26	2	7	14	23	5		
Grasshoppers	:	0	0	0	0	1	0	0	0	0	
Lady beetles	:	0	0	0	0	0	0	1	0	0	
Bumble bees	:	0	0	0	0	0	0	0	0	0	

GRB

GRB - Water And Silt Samples^{1/}

- A - Well Water
- B - Water leaving the study area
- C - Water running off the fields
- D - Water draining onto the area from outside
- E - Water flowing off fields immediately after rain

Material sampled	Location	Date 1964	Log number	Pesticides found	
				ppb	ppm
D Water	7	6/10	G4-227	N	
D Silt	7	6/10	252		N
D Water	6	6/10	228	N	
D Silt	6	6/10	253		0.3 p,p DDT T DDE
A Water - Irrigation water from cotton field south of area				0.46 Lindane	
A Water	5	6/16	230	N	
C Water	2	6/10	231	0.55 Lindane	
C Silt	2	6/10	254		N
B Silt	3	7/10	565		N
D Silt	6	7/10	571		N
D Water	6	7/10	585	N	
D Water	6	7/10	586	N	
D Water	6	7/10	587	N	
D Silt	1	7/2	575		1.9 p,p DDT
D Water	1	7/2	594	N	
C Silt	2	7/2	580	Analysis incomplete	
C Water	2	7/2	592	T Lindane	
D Silt	7	7/10	581		N
D Water	7	7/10	588	N	
D Water	7	7/10	589	N	
D Water	7	7/10	590	N	
A Water	5	7/11	591	Analysis incomplete	
B Water	3	7/11	593	T Lindane	
A Water	8	7/9	595	N	
B Silt	3	7/16	625		0.31 o,p DDT 0.1 p,p DDE
B Water	3	7/16	685	0.56 Lindane	

^{1/} Classifications B, C, D, and E also apply to silt.

7-B

GRB - Water And Silt Samples (Cont'd.)

Material sampled	Location	Date 1964	Log number	Pesticides found	
				ppb	ppm
C Silt	2	7/16	G4-626		T p,p DDT 0.32 o,p DDT 0.19 DDE
C Water	2	7/16	684	N	
D Water	4	7/24	960	0.14	Lindane
D Silt	4	7/24	1041		0.58 p,p DDT 0.1 o,p DDT 0.4 DDE
D Water	1	7/24	961	N	
D Silt	1	7/24	1042		0.66 p,p DDT 1.57 o,p DDT 0.36 DDE
A Water	8	7/25	962	N	
A Water	5	7/31	1125		0.19 p,p DDT 0.52 o,p DDT 0.11 DDE
D Water	4	8/9	1482	N	
D Silt	6	8/7	1358		T DDE 0.13 Endrin
D Water	6	8/7	1483	N	
D Water	6	8/7	1484	N	
D Water	6	8/7	1485	N	
D Silt	7	8/7	1359		T p,p DDT T o,p DDT 0.11 DDE T Dielldrin
D Water	7	8/7	1486	N	
D Water	7	8/7	1487	N	
D Water	7	8/7	1488	N	
A Water	8	8/10	1489	N	
D Silt	1	8/18	1546		T p,p DDT 0.39 o,p DDT T DDE 0.11 Endrin
D Water	1	8/18	1633	N	

GRB - Water And Silt Samples (Cont'd.)

Material sampled	Location	Date 1964	Log number	Pesticides found	
				ppb	ppm
D Silt	4	8/17	G4-1547		T Lindane 0.5 p,p DDT 1.09 o,p DDT 0.35 DDE T Dieldrin T Endrin
D Water	4	8/17	1635	N	
B Silt	3	8/17	1548		0.3 o,p DDT T DDE
B Water	3	8/17	1636	N	
C Silt	2	8/24	1802		0.12 p,p DDT 0.65 o,p DDT 0.16 DDE
C Water	2	8/24	1830	N	
D Water	4	8/21	1831	N	
D Silt	6	9/1	1952		0.06 p,p DDT 0.36 o,p DDT 0.12 DDE
D Water	6	9/1	1959	N	
D Water	6	9/1	1960	N	
D Water	6	9/1	1964	N	
D Silt	7	9/1	1949		T p,p DDT 0.47 o,p DDT 0.27 DDE
D Water	7	9/1	1955	N	
D Water	7	9/1	1957	N	
D Water	7	9/1	1958	N	
C Silt	2	9/7	2117		T o,p DDT 1.1 o,p DDT 0.2 DDE 0.15 Dieldrin
C Water	2	9/7	2149	N	
D Silt	1	9/15	2239		0.6 p,p DDT 2.8 o,p DDT 0.4 DDE T Dieldrin

GRB - Water And Silt Samples (Cont'd.)

Material sampled	Location	Date 1964	Log number	Pesticides found	
				ppb	ppm
B Silt	3	9/15	G4-2240		0.3 p,p DDT
B Water	3	9/15	2361	N	
D Silt	4	9/28	2633		0.41 p,p DDT 0.48 o,p DDT 0.36 DDE
D Silt	6	10/2	2634		T Lindane 0.36 p,p DDT 0.4 o,p DDT 0.22 DDE
D Silt	7	10/2	2641		N

GRB - Apiary Samples

Material sampled	Date 1964	Log number	Pesticides found ppm
Bees	7/16	G4-727	0.29 p,p DDT 0.13 o,p DDT 0.22 p,p DDE 0.18 o,p DDE 0.11 Dieldrin
Nectar - Hive 3	7/3	777	N
Nectar - Hive 4	7/3	779	N
Honey - Hive 2	8/3	1172	N
Nectar	8/6	1190	N
Nectar	8/6	1191	N
Nectar	7/21	1192	N
Nectar	7/21	1193	N
Bees	8/4	1222	T Lindane 1.24 p,p DDT 0.64 o,p DDT 0.39 p,p DDE T o,p DDE T Dieldrin 0.27 Endrin T Heptachlor
Pollen	8/6	1225	N
Bees	7/30	1226	0.13 Lindane 0.13 p,p DDE 0.26 o,p DDE 0.1 Heptachlor
Bees	8/13	1453	0.41 p,p DDT 0.22 o,p DDT 0.26 p,p DDE 0.16 o,p DDE 0.11 Dieldrin 0.33 Parathion
Bees	8/20	1688	0.64 p,p DDT 0.41 o,p DDT 0.28 p,p DDE 0.31 o,p DDE 0.16 Dieldrin T Heptachlor

GRB - Apiary Samples (Cont'd.)

Material sampled	Date 1964	Log number	Pesticides found ppm
Bees	8/19	G4-1691	T Lindane 1.29 p,p DDT 0.44 o,p DDT 0.34 p,p DDE 0.14 o,p DDE T Dieldrin
Bees	8/14	1692	0.63 p,p DDT 0.38 o,p DDT 0.3 p,p DDE 0.16 o,p DDE 0.1 Dieldrin
Nectar	8/20	1735	N
Bees	8/18	1847	0.12 Dieldrin
Bees	8/25	1851	0.11 Lindane 0.88 p,p DDT 0.52 o,p DDT 0.66 p,p DDE 0.13 Heptachlor
Honey - Hive 2	8/17	1895	N
Honey - Hive 4	8/17	1896	N
Pollen - Hive 2	9/1	2041	N
Bees	9/1	2043	1.63 p,p DDT 0.61 o,p DDT 0.34 p,p DDE 0.29 o,p DDE 0.5 Dieldrin 0.33 Endrin
Bees	9/10	2229	0.67 p,p DDT 0.28 o,p DDT 0.56 p,p DDE 0.52 o,p DDE 0.56 Dieldrin 0.16 Heptachlor
Bees	9/7	2230	T Lindane 0.53 p,p DDT 0.4 o,p DDT 0.24 p,p DDE 0.29 o,p DDE 0.25 Dieldrin T Heptachlor

GRB - Apiary Samples (Cont'd.)

Material sampled	Date 1964	Log number	Pesticides found ppm
Bees	9/8	G4-2231	1.03 p,p DDT 0.38 o,p DDT 0.25 DDE T Dieldrin
Bees	9/24	2507	1.39 p,p DDT 0.53 o,p DDT 0.37 p,p DDE T o,p DDE T Dieldrin T Heptachlor 0.21 Methyl Parathion 0.86 Parathion
Bees	9/22	2508	T Lindane 0.19 p,p DDT 0.18 o,p DDT 0.21 p,p DDE 0.17 o,p DDE 0.34 Dieldrin T Heptachlor 0.53 Parathion
Bees	9/23	2509	T Lindane 2.7 p,p DDT 1.4 o,p DDT 0.78 DDE 0.24 Dieldrin 0.1 Heptachlor
Pollen - Hive 2 Vial 1	8/18	2664	N
Pollen - Hive 2 Vial 2	8/18	2665	N
Pollen - Hive 2 Vial 1	8/18	2667	N
Pollen - Hive 2 Vial 2	8/18	2668	N
Pollen - Hive 2 Vial 3	8/18	2669	N
Pollen - Hive 2 Vial 4	8/18	2670	N

GRB - Apiary Samples (Cont'd.)

Material sampled	Date 1964	Log number	Pesticides found ppm
Pollen - Hive 2 Vial 5	8/18	G4-2671	0.6 Heptachlor Epox.
Pollen - Hive 2 Vial 6	8/18	2672	N
Pollen - Hive 2 Vial 7	8/18	2673	1.1 p,p DDT
Pollen - Hive 2 Vial 1	9/30	2680	N
Pollen - Hive 2 Vial 2	9/30	2681	N
Pollen - Hive 2 Vial 3	9/30	2682	3.6 p,p DDT
Pollen - Hive 2 Vial 4	9/30	2683	N
Pollen - Hive 2 Vial 5	9/30	2684	14.3 p,p DDT
Pollen - Hive 2 Vial 1	10/13	2685	N
Pollen - Hive 2 Vial 2	10/13	2686	N
Pollen - Hive 2 Vial 3	10/13	2687	N
Pollen - Hive 2 Vial 4	10/13	2688	N
Pollen - Hive 2 Vial 2	9/1	2707	N
Pollen - Hive 2 Vial 3	9/1	2708	N

GRB - Crop Samples

Material sampled	Date 1964	Log number	Pesticides found ppm
Cotton - Block 1 Whole Plant	9/18	G4-2387	0.35 Lindane 5.32 p,p DDT 2.36 o,p DDT 0.55 p,p DDE 0.56 o,p DDE
Soybeans - Block 3	10/21	2750	N
Soybeans - Block 5 Whole Plant	9/24	2377	1.2 p,p DDT 0.83 o,p DDT 0.49 DDE
Sorghum Cane - Block 8	9/1	1975	0.2 Lindane 0.73 p,p DDT 0.42 o,p DDT 0.24 p,p DDE 0.42 o,p DDE

ADDED 12/11/64

Sorghum Cane - Block 8	9/1	1976	0.24 Lindane 0.68 p,p DDT 0.15 o,p DDT 0.21 p,p DDE 0.43 o,p DDE 0.21 Dieldrin
Cotton - Block 2 Whole Plant	9/18	2392	0.13 Lindane 2.24 p,p DDT 0.31 o,p DDT 0.14 DDE 0.43 Dieldrin
Corn - Block 1 (Green forage, no grain)	7/2	701	N
Forage (Grass) - Block 6	6/10	702	0.23 p,p DDT
Soybeans - Block 3 Whole Plant	9/24	2376	0.18 Lindane 0.3 p,p DDE 0.13 o,p DDT 0.55 p,p DDE 0.82 o,p DDE 0.55 Dieldrin

GRB - Miscellaneous Samples

Material sampled	Date 1964	Log number	Pesticides found	
			ppb	ppm
Soil Insects - Block 6	6/29	G4-782		N
Earthworm - Block 8	6/30	783		N
Soil Insects - Block 8	7/27	1217		N
Soil Insects - Block 6	7/17	1218		N
Soil Insects - Block 8	7/27	1219		N
Soil Insects - Block 6	7/17	1220		N
Algae - Location 6	9/3	1982		0.54 p,p DDT 0.59 o,p DDT 1.88 DDE
Algae - Location 5	9/8	2489		1.01 o,p DDT 0.62 DDE
Minnows - Block 1	8/11	1452		0.44 p,p DDT 0.47 o,p DDT 0.2 p,p DDE

ADDED 12/11/64

Turtle - Location 6 (<u>Pseudemys troosti elegans</u> (Weid.))	7/30	1134		0.47 Lindane 0.31 p,p DDT T o,p DDT 0.16 p,p DDE 0.35 o,p DDE 0.14 Dieldrin
Turtle - Location 6	6/25	815	(A) <u>Chrysemys picta belli</u> (Gray)	0.12 Lindane 0.24 p,p DDT 0.23 o,p DDT 0.21 p,p DDE
			(B) <u>Sternotherus oderatus</u> (Latreille)	0.45 p,p DDT 0.43 o,p DDT 0.38 p,p DDE

GRB - Miscellaneous Samples (Cont'd.)

Material sampled	Date 1964	Log number	Pesticides found ppb ppm
<u>ADDED 12/11/64</u>			
Turtles - Location 6	8/19	G4-1672	(A) <u>Amyda</u> sp. 0.15 Lindane 0.23 p,p DDT 0.13 p,p DDE 0.3 Dieldrin 0.33 Endrin (B) <u>Kinosternon subrubrum</u> T Aldrin 0.35 Lindane 0.59 p,p DDT 0.32 o,p DDT 0.43 p,p DDE 0.46 o,p DDE 0.11 Dieldrin T Endrin (C) <u>Chrysemys picta belli</u> 0.12 Lindane 2.6 p,p DDT 1.0 o,p DDT 0.23 p,p DDE 0.16 Dieldrin
Turtles - Block 1 (Location 7)	7/11	816	N
Turtles - Location 7	8/4	1137	T o,p DDT 2.32 p,p DDE 0.48 Dieldrin
Pollen - Block 1	7/21	1334	0.16 Lindane 0.31 p,p DDT 0.11 o,p DDT 0.16 p,p DDE 0.26 o,p DDE 0.22 Dieldrin 0.5 Endrin

BIOLOGICAL RECORD
LIGHT TRAP COLLECTIONS

Indicator Species	June 17	June 25	Totals-Operated One Night Per Week					Aug. 6
			June 25	July 9	July 16	July 23	July 30	
Click beetles	2	25	3	0	1	2	0	33
<u>Calosoma</u> spp. (Predatory ground beetles)	0	0	0	1	4	2	0	3
Blister beetles	9	19	1	1	0	4	6	42
<u>Dyscinetus</u> spp. and <u>Cyclocephala</u> spp. (scarabs)	0	0	0	0	0	0	0	0
Spotted cucumber beetle	0	6	2	0	0	5	6	70
Tiger beetles	0	2	0	0	0	0	0	1
Giant Water bug	1	0	0	0	0	0	0	0
Southern green stink bug	4	0	1	1	0	1	0	12
Treehoppers	0	0	0	0	0	0	0	0
<u>Protoparce</u> spp. (hornworm moths)	0	0	1	0	0	2	1	4
Salt-marsh caterpillar	17	0	0	0	0	1	1	6

GRB

Light Traps Continued

2

Indicator Species	Totals-Operated One Night Per Week							
	Aug. 13	Aug. 20	Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24	Oct. 1
Click beetles	2	0	3	1	0	0	0	0
Calosoma spp. (Predatory ground beetles)	1	0	3	0	0	1	2	3
Blister beetles	6	0	5	5	1	0	1	0
Dyscinetus spp. and Cyclocephala spp. (scarabs)	1	0	0	0	0	0	0	0
Spotted cucumber beetle	4	0	3	5	2	0	0	1
Tiger beetles	1	0	0	0	0	0	0	0
Giant Water bug	1	0	0	0	0	0	0	2
Southern green stink bug	2	0	0	0	0	0	0	0
Treehoppers	0	0	0	0	0	0	0	0
Protoparce spp. (hornworm moths)	1	1	3	3	10	2	0	0
Salt-marsh caterpillar	3	4	1	3	21	10	13	1

GRB

NUISANCE PESTS

CHIGGERS

[illegible]

S1=Sample One
S2=Sample Two

GRB

BIOLOGICAL RECORD

NUISANCE PESTS

MOSQUITOES

(Total Larvae Per Five Dips-One Collection Weekly)													
July 11		July 15		July 24		July 30		Aug. 5		Aug. 14		Aug. 21	
S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
0	4	3	18	5	25+	25+	0	0	5	0	7	0	0

Aug. 25		Sept. 2		Sept. 9		Sept. 16		Sept. 23		Oct. 5			
S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
0	0	0	0	0	0	0	0	0	0	0	0	0	0

S1=Sample One
S2=Sample Two

GRB

BIOLOGICAL RECORD

NUISANCE PESTS

TABANIDS

(Average Number Per Animal-Counts Made Once Per Week)															
June		June 16		July 4		July 11		July 16		July 20		July 28		Aug. 5	
S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
1.6	1.2	.4	.4	0	.4	.4	.2	1.25	.75	1	.6	1.25	1.0	.5	1.0

Aug. 11		Aug. 18		Aug. 24		Sept. 1		Sept. 11		Sept. 14		Sept. 24		Oct. 5	
S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
.75	1.0	2.0	0	0	.25	.2	1	1.5	1.4	.2	0	0	0	0	0

S1=Sample One
S2=Sample Two

GRB

BIOLOGICAL RECORD

NUISANCE PESTS

TICKS

(Adults and Nymphs Per Ten 100-Foot Drags-One Collection Weekly)											
June 18	June 25	June 26	July 2	July 11*	July 13	July 20	July 29	Aug. 3			
S1 S2	S1 S2	S1 S2	S1 S2	S1 S2	S1 S2	S1 S2	S1 S2	S1 S2	S1 S2	S1 S2	S1 S2
0	0	0	0	0	1	0	0	0	0	0	0

Aug. 10	Aug. 18	Aug. 24	Aug. 31	Sept. 11	Sept. 14	Sept. 23	Oct. 5				
S1 S2	S1 S2	S1 S2	S1 S2	S1 S2	S1 S2	S1 S2	S1 S2	S1 S2	S1 S2	S1 S2	S1 S2
0	0	0	0	0	0	0	0	0	0	0	0

S1=Sample One
S2=Sample Two

*Only one sample taken.

GRB

1964 WEATHER DATA GRB

MAY

Date	Temperature		Humidity		Rain- fall
	Max.	Min.	Max.	Min.	
1	75	56	-	-	0
2	80	62	-	-	.70
3	80	53	-	-	0
4	81	61	-	-	0
5	81	61	-	-	0
6	84	61	-	-	0
7	84	67	-	-	0
8	85	66	-	-	T
9	87	69	-	-	0
10	80	68	-	-	.10
11	86	71	-	-	0
12	85	64	-	-	.05
13	84	55	-	-	T
14	79	53	-	-	0
15	78	51	-	-	0
16	83	54	-	-	0
17	87	57	-	-	0
18	90	59	-	-	0
19	93	63	-	-	0
20	93	68	-	-	0
21	92	66	-	-	T
22	95	66	-	-	0
23	92	68	-	-	.16
24	85	68	-	-	0
25	90	67	-	-	0
26	94	69	-	-	0
27	97	70	-	-	0
28	97	74	-	-	.02
29	88	53	-	-	T
30	80	58	-	-	.03
31	78	61	-	-	.42

JUNE

Date	Temperature		Humidity		Rain- fall
	Max.	Min.	Max.	Min.	
1	64	58	-	-	.17
2	76	55	-	-	0
3	82	59	-	-	0
4	83	56	-	-	0
5	89	58	-	-	0
6	89	63	-	-	0
7	89	63	-	-	0
8	94	69	-	-	0
9	93	70	-	46	0
10	96	76	98	41	0
11	97	74	98	32	0
12	100	75	97	38	0
13	99	75	91	37	0
14	96	76	88	36	0
15	97	53	98	36	0
16	97	76	100	45	.07
17	90	71	100	40	0
18	94	71	94	38	0
19	95	75	92	40	0
20	96	76	92	40	0
21	96	69	94	38	0
22	99	74	94	32	0
23	101	76	90	47	.85
24	94	73	100	26	0
25	93	65	78	29	0
26	94	64	72	34	0
27	95	72	93	40	0
28	95	70	92	32	0
29	95	74	97	46	.07
30	94	70	100	54	0

1964 WEATHER DATA GRB

JULY

Date	Temperature		Humidity		Rain- fall
	Max.	Min.	Max.	Min.	
1	88	70	100	46	.88
2	92	72	100	50	T
3	87	69	100	64	.47
4	84	69	100	48	T
5	93	73	100	40	0
6	98	76	97	41	0
7	99	73	99	30	0
8	100	79	92	32	0
9	101	73	100	60	0
10	90	68	100	61	.56
11	90	74	100	70	T
12	86	76	100	56	0
13	88	67	100	32	0
14	82	58	100	30	0
15	90	66	96	48	.95
16	91	68	100	44	0
17	92	67	100	38	0
18	94	71	99	34	0
19	94	69	100	34	0
20	98	73	96	40	0
21	98	75	-	37	0
22	97	74	96	35	0
23	95	71	99	38	T
24	95	72	100	44	0
25	95	74	100	40	0
26	96	73	97	52	0
27	93	70	100	46	T
28	93	73	100	48	0
29	93	75	98	52	0
30	92	72	100	56	.65
31	92	72	100	44	.35

AUGUST

Date	Temperature		Humidity		Rain- fall
	Max.	Min.	Max.	Min.	
1	95	72	100	50	.05
2	91	71	100	44	0
3	95	73	100	42	T
4	99	75	98	30	0
5	102	75	96	44	T
6	95	72	100	36	0
7	95	73	100	40	0
8	96	74	100	44	0
9	94	71	100	44	0
10	95	73	100	-	.05
11	95	75	100	52	.22
12	93	72	100	50	.05
13	80	58	100	38	.05
14	82	63	100	50	0
15	86	69	-	-	.13
16	88	69	100	63	2.50
17	76	66	100	82	.03
18	81	63	100	60	0
19	84	61	100	62	0
20	88	68	100	44	0
21	90	73	99	52	T
22	90	68	98	58	.06
23	84	72	97	64	0
24	88	71	99	60	T
25	88	71	100	57	.20
26	90	68	100	50	.05
27	87	65	100	52	0
28	90	71	100	44	0
29	93	71	100	42	0
30	94	73	100	36	0
31	96	69	100	44	.01

1964 WEATHER DATA GRB

SEPTEMBER

Date	Temperature		Humidity		Rain- fall
	Max.	Min.	Max.	Min.	
1	95	71	100	42	0
2	95	66	98	30	.21
3	94	64	100	32	0
4	96	70	100	37	0
5	96	69	100	40	0
6	95	70	100	38	0
7	92	71	100	50	.03
8	88	67	100	40	0
9	92	65	100	30	0
10	94	61	100	30	0
11	94	68	86	34	0
12	95	60	80	28	0
13	82	52	80	28	0
14	79	49	86	26	0
15	85	51	96	30	0
16	88	64	92	48	0
17	86	68	100	70	.09
18	82	70	100	42	.01
19	88	62	100	40	0
20	90	64	100	40	0
21	92	69	100	40	0
22	93	69	96	42	0
23	92	68	100	45	0
24	88	59	92	23	0
25	83	50	94	22	0
26	85	58	78	26	0
27	88	64	97	58	0
28	86	53	100	100	3.5
29	60	53	100	94	.75
30	66	58	100	73	0

OCTOBER

Date	Temperature		Humidity		Rain- fall
	Max.	Min.	Max.	Min.	
1	80	63	100	70	0
2	82	68	100	70	0
3	76	66	98	81	0
4	72	58	100	36	0
5	64	50	72	34	0
6	63	40	100	30	0
7	68	36	100	28	0
8	75	40	100	34	0
9	64	48	100	40	0
10	67	38	98	28	0
11	71	37	100	24	0
12	76	40	100	37	0
13	74	46	100	41	0
14	62	58	100	86	0
15	66	50	100	62	.63
16	77	48	100	44	0
17	84	55	100	40	0
18	84	52	100	46	0
19	62	42	90	22	0
20	64	34	100	26	0
21	76	38	100	22	0
22	78	42	100	30	0
23	69	45	72	28	0
24	72	40	98	28	0
25	75	38	100	28	0
26	76	44	100	40	0
27	80	50	100	50	0
28	79	54	100	50	0
29	80	52	100	48	0
30	72	50	100	30	0
31	72	42	100	34	0

Blood Cholinesterase Determinations

All human blood sample cholinesterase levels were determined by the standard Michel method and are reported in mean delta pH/hour. The second sample (October 6) on personnel at site STA-B was not taken due to circumstances beyond control of the individuals involved.

All bovine and equine blood sample determinations were made after diluting buffer solutions used in the standard Michel procedures. This was done in order that the mean delta pH/hour would fall within a suitable and workable range. Since there was no known source of normal average levels for these animals and no preexposure levels were determined, these data will only serve as an indication of seasonal fluctuations. Additional blood samples will be drawn early in calendar year 1965 and again through the summer months.

Cholinesterase Study - 1964

Area	Species	Identification No.	Sample No. 1 - Aug 31		Sample No. 2 - Oct 6	
			Erythrocytes	Plasma	Erythrocytes	Plasma
GRB	Bovine	0-1	.53	.30	.50	.33
		0-2	.54	.33	.62	.30
		0-3	.22	.18	.43	.21
		0-4	.50	.35	.40	.32
		0-5	.71	.28	.62	.30
		0-6	.40	.21	.47	.28
		0-7	<u>1/</u>		.44	.25
		0-8	<u>1/</u>		.60	.31
		0-9	<u>1/</u>		.37	.27
		0-10	<u>1/</u>		.42	.32
		0-11	<u>1/</u>		.53	.30
		0-12	<u>1/</u>		.17	.22

GRA-B	Human	WFH-1	.35	.84	.30	.45
		DNM-2	<u>1/</u>		.46	.42

SCA-B	Human	JHM-3	.60	.88	.44	.42
-------	-------	-------	-----	-----	-----	-----

Area	Species	Identification No.	Sample No. 1 - Aug 31		Sample No. 2 - Sep 21	
			Erythrocytes	Plasma	Erythrocytes	Plasma
CHA-B	Human	DCM-1	.47	.61	.38	.26
		WLS-2	.37	.58	.39	.45
STA-B	Human	GFK-1	.31	.51		
		BRH-2	.39	.49		
FBA	Mare	417	.38	1.01	.38	.43
	Colt	472	.34	.72	.45 <u>2/</u>	.84
	Horse	470	.27	.84	.50 <u>2/</u>	.94
FBB	Human	JHD-1	.35	.59	.32 <u>2/</u>	.55
FBA	Human	GND-1	.45	.82	.43	.47

1/ Sample hemolyzed

2/ Hemolyzed but resampled 10/26/64

Relation of Pesticides to Honey Bee Colonies on Plots GRA and GRB

Two colonies of honey bees were placed on each plot June 11, 1964. A dead bee trap, designed to collect the bees that die inside the colony was placed on one colony. A pollen trap, designed to strip pollen pellets from the legs of incoming bees, was on the second colony.

Dead bees were collected daily. Pollen was collected from the trap and fresh nectar from the combs at bi-weekly intervals. Honey and live bee samples were taken intermittently from the hive.

The daily number of dead bees, shown elsewhere, increased following insecticide applications on cotton. The mortality was heavy the first 24 hours after application.

At GRA the original population of about 40,000 bees per hive was reduced to about 30,000 during most of the period from July 20 to September 1. At GRB the populations were reduced to about 25,000 bees.

After insecticide applications ceased in the cotton fields a slight loss occurred from insecticide treatment of soybeans.

From June 11 to September 21 the colonies at GRA gained about 100 pounds of honey each and those at GRB about 80 pounds. This is not necessarily the net surplus, nor does it indicate what the surplus might have been without exposure to insecticides.

A favorable fall climate has allowed all colonies to rebuild their populations, but GRB colonies do not have enough stored pollen for early spring build-up.

The latent effect of the damage or of any pesticide stored in the hive on colony development this winter or next season is unknown.

(Entomology Research Division)

NATIONAL AGRICULTURAL LIBRARY



1022411829

